VOLUME XXXVII NUMBER SIX

THE NATIONAL GEOGRAPHIC MAGAZINE

JUNE, 1920

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PUBLISHED BY THE
NATIONAL GEOGRAPHIC SOCIETY
HUBBARD MEMORIAL HALL
WASHINGTON, D.C.

$3.00 A YEAR 35c. THE COPY

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To carry out the purpose for which it was founded thirty-two years ago, the National Geographic Society publishes this Magazine. All receipts from the publication are invested in the Magazine itself or expended directly to promote geographic knowledge and the study of geography. Articles or photographs from members of the Society, or other friends, are desired. For material that the Magazine can use, generous remuneration is made. Contributions should be accompanied by an addressed return envelope and postage, and be addressed: Editor, National Geographic Magazine, 16th and M Streets, Washington, D. C.

Important contributions to geographic science are constantly being made through expeditions financed by funds set aside from the Society's income. For example, immediately after the terrific eruption of the world's largest crater, Mt. Katmai, in Alaska, a National Geographic Society expedition was sent to make observations of this remarkable phenomenon. So important was the completion of this work considered that four expeditions have followed and the extraordinary scientific data resultant given to the world. In this vicinity an eighth wonder of the world was discovered and explored—"The Valley of Ten Thousand Smokes," a vast area of steaming, spouting fissures, evidently formed by nature as a huge safety-valve for erupting Katmai. By proclamation of the President of the United States, this area has been created a National Monument. The Society organized and supported a large party, which made a three-year study of Alaskan glacial fields, the most remarkable in existence. At an expense of over $50,000 it has sent a notable series of expeditions into Peru to investigate the traces of the Inca race. The discoveries of these expeditions form a large share of the world's knowledge of a civilization which was waning when Pizarro first set foot in Peru. Trained geologists were sent to Mt. Pelee, La Soufriere, and Messina following the eruptions and earthquakes. The Society also had the honor of subscribing a substantial sum to the historic expedition of Admiral Peary, who discovered the North Pole April 6, 1909. Not long ago the Society granted $20,000 to the Federal Government when the congressional appropriation for the purchase was insufficient, and the finest of the giant sequoia trees of California were thereby saved for the American people and incorporated into a National Park.

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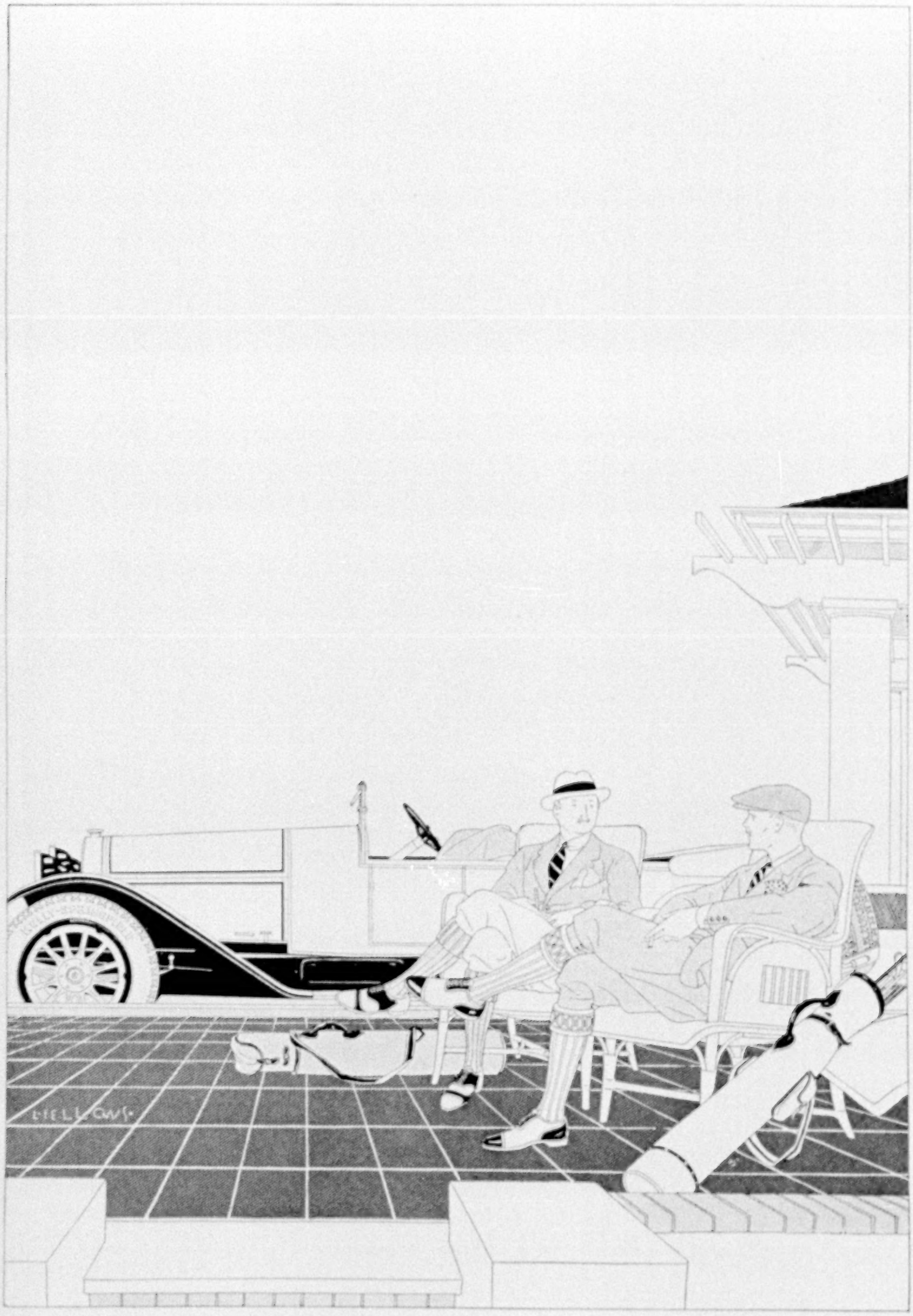
America's Finest and Most Expensive Motor Car

THE LOCOMOBILE

HARE'S MOTORS, INC., NEW YORK CITY

· We Shall Keep Faith ·



"What mileage do you get out of those tires?"
"Mileage? You don't reckon the life of a Kelly-Springfield by miles—you reckon it by years."

Executives going to a conference in their company's Packard. Hundreds of Corporations have standardized on Packard on an economy basis—high mileage per dollar of investment and low running cost over a term of years.

Does the Car Buyer *Want* the Facts

THE late Joseph Choate used to say that lawyers would go out of business if men were not so bent on making the same old mistakes the same old way.

No one need — or *can* — make the old mistakes in selecting his motor car, if he will look for *transportation facts* instead of "features" and "talking points."

The strong Packard opinion which he finds on every hand does not express itself in technical details or costly luxury — but in such everyday words as *economy, comfort, ability,* and *lasting value.*

LET a man figure on keeping his Packard from *six* to *ten years*— and he has a material saving in *investment* as against the car that must be traded in every two or three years.

Think of the *stability* of the Packard design! His Packard always a "new model."

His gasoline mileage will be from nine to thirteen, depending on road conditions. Oil mileage, 700 or more to the gallon. Tires properly cared for, ten thousand to sixteen thousand miles.

The steel in his Packard is worth more than twice as much as the steel in the ordinary car.

The moving parts in the Twin-Six engine are better balanced than in any other automobile engine. Consequently there is less vibration and less wear on bearings.

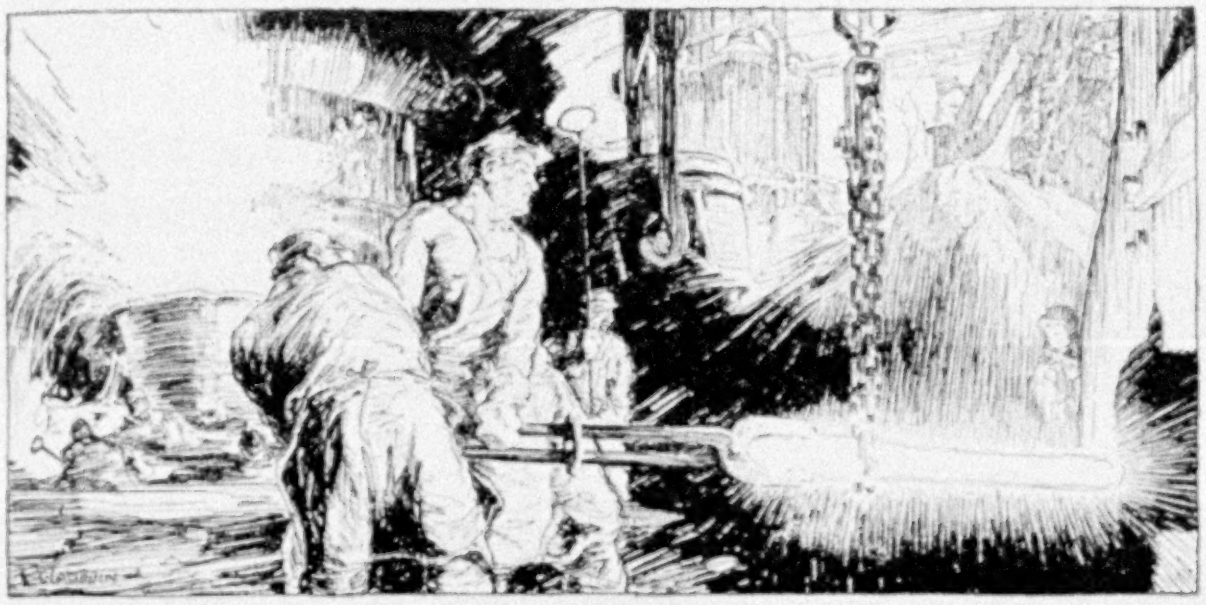
WHEN a man buys a motor car he knows pretty well what sort of transportation he expects it to deliver.

Economy does not lie in the direction of temporary make-shifts or compromises.

Packard first-class transportation will give him a definite and permanent advance in his way of traveling. It will cost him less per passenger mile during his whole motoring experience — than even second-class transportation.

"Ask the Man *Who Owns One"*

PACKARD MOTOR CAR COMPANY, *Detroit*



FORGING *for* PROGRESS

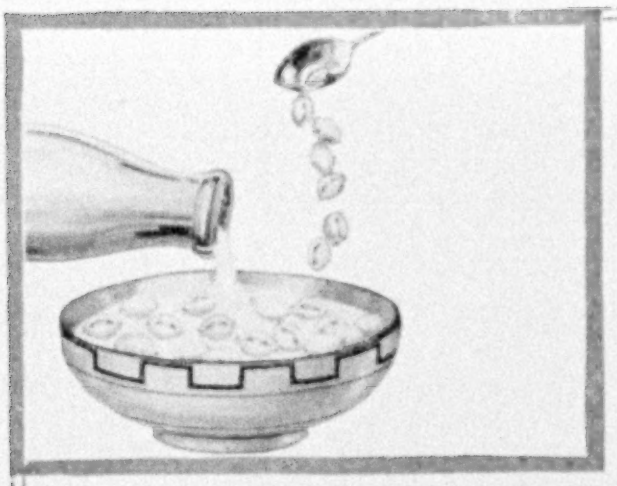
FROM the mines and mills of the Middle West come the metals and machinery which are used in doing much of the world's work. Out of the iron ranges of Michigan and Minnesota flows an endless current of ore to the steel mills of the Chicago District. Here where titanic accomplishment is the common measure of the day's work—this ore is fashioned to fit the needs of man and thence transported to the uttermost parts of the earth.

IN the financing of the steel industry of the Middle West the Continental and Commercial Banks have contributed service fully commensurate with the vast importance of the interests involved.

The CONTINENTAL *and* COMMERCIAL BANKS

CHICAGO

INVESTED CAPITAL MORE THAN 50 MILLION DOLLARS.
RESOURCES MORE THAN 500 MILLION DOLLARS.



Wheat Bubbles

Puffed Wheat is whole wheat steam-exploded, puffed to 8 times normal size. The taste is like toasted nut-meats. The texture is flimsy and flaky.

Children Forget

All Other Dishes When They Get This

You never tasted cereals that compare with Puffed Grains. Other grain foods lose their charm when children once know these.

Why not then serve them—all three kinds—morning, noon and night? And in a dozen ways?

Two are whole grains with whole-grain nutrition. One is corn hearts puffed and toasted—a sweet, flavory dainty.

All are steam-exploded. Every food cell is blasted by Prof. Anderson's process. So every atom feeds. No other process so fits these grains for food.

Flimsy Tidbits

But they are whole grains made delightful and easy to digest.

Too Good, Some Mothers Say

Some mothers say that Puffed Grains are too good. Children eat too many, displacing other foods.

But Puffed Wheat in milk is the greatest food that children ever get. All the 16 food elements are there, and fitted to digest. Whatever food Puffed Wheat displaces, the child is better for it. Few people ever get enough of the minerals in whole wheat.

Blend with Fruit

These flimsy, crusty morsels add enticements.

In the morning serve with cream and sugar. At night in bowls of milk. For variety's sake serve all three Puffed Grains. But the greatest is Puffed Wheat.

After School

Crisp Corn Puffs and lightly douse with butter. Let children eat like peanuts or popcorn. Nothing you can serve to hungry children is so good for them.

Puffed Wheat **Puffed Rice** **Corn Puffs**

All Steam-Exploded—8 times Normal Size
Also Puffed Rice Pancake Flour

3350

FAIRBANKS-MORSE

"Z" Engine Dominates Farm Engine Field

YOU need look no further than the Fairbanks-Morse "Z" Engine for an example of the service this great house has rendered to agricultural development. Here, too, you will find the product always approaching the goal reflected in the Fairbanks-Morse Quality Seal.

For no *ordinary* engine would meet the farm power requirements of more than a quarter million users. Years of unceasing research—hundreds of thousands of dollars spent in perfecting manufacturing processes—the efforts of thousands of skilled engine builders—all have gone into the "Z" to make it what it is today.

This sturdy engine has helped revolutionize farming methods. It has released countless farm hands for the productive work of feeding the world. Its uses are as varied as the applications of power itself. Its dependability is a by-word wherever the "Z" is used.

Our products include Fairbanks Scales—oil engines—pumps—electric motors and generators—railway appliances and coaling stations—farm power machinery, such as "Z" engines, lighting plants, water systems.

FAIRBANKS, MORSE & CO.
MANUFACTURERS CHICAGO

World-wide distribution through our own branches and representatives

Style Permanency Enhances Hudson's Famed Endurance

Lasting Design is the Natural Complement to the Durability of the Super-Six Motor

However mechanically good, a vast satisfaction is lost to the owner if design changes in succeeding models mark his car out of date.

Thus style permanency must be a major factor in a car that serves for years.

Its value is exampled by the earliest Super-Sixes, built nearly five years ago. In all essentials they are modern cars today. They are modern in appearance. They have lost none of their operating smoothness, flexibility, or power. Their performance is characteristic of all Hudsons. Few would see in their looks or performance anything but a car of recent production.

Think Ahead When You Buy a Car

Time will bring you, too, the keenest appreciation of Hudson's mechanical endurance and style stability.

Undoubtedly, thousands of Hudson owners chose it primarily for its beauty of design, its luxury, and distinction of appearance.

But let nothing blind the real issue. It is performance; and endurance is foremost. Speed and power have their place. But they are secondary. Hudson has no cause to underrate them. For it holds the stock-car speed and power records. And the Super-Six motor has beaten the world's fastest racing cars, not once, but many times.

The records prove it is open champion. It draws no distinction of type, size, cylinders, or price. It has won against the field.

Why the Super-Six Principle Gives the Mastery

Hudson dominance lies in the Super-Six motor, which controls vibration. Perfection would mean a vibrationless motor, free of friction. No machinery is that. But the Super-Six motor comes within 10% of it—closer to the ideal than any other type. Nearer approach seems impossible.

In the exclusive Super-Six motor power is increased 72% and motor efficiency 80%.

Naturally such a car is in demand. Since it was brought out, nearly five years ago, it has been the largest selling fine car in the world. This year, as in all years previous, many who want Hudsons will have to wait for delivery.

Hudson Motor Car Company, Detroit, Michigan

(3056)

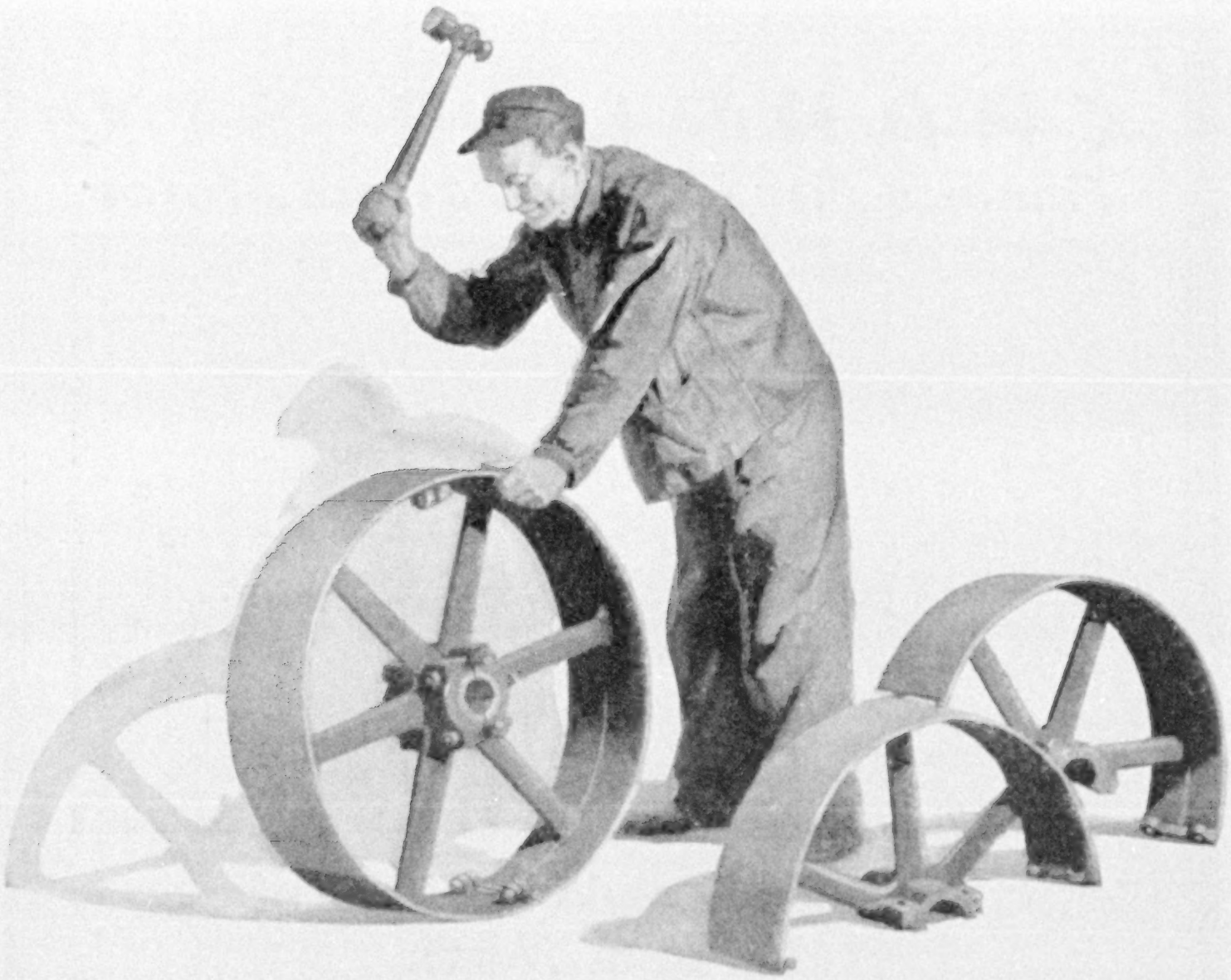
WE have repeatedly stated that freedom from repair bills and excessive depreciation is the only true proof of economy in a motor car. First cost—the initial investment—is of course an important consideration but *ultimate* cost is vastly more important.

A realization of this fundamental fact is responsible for the Paige tradition of quality manufacturing. Our ambitions are solely concerned with the production of motor vehicles that will express a practical idealism and justify the capital investments of ourselves and our owners.

PAIGE-DETROIT MOTOR CAR COMPANY, DETROIT

Manufacturers of Paige Motor Cars and Motor Trucks

"Mention The Geographic—It identifies you"



Identification—

The rim of a Dodge Standard Iron Pulley is *cast whole;* then *split* at the parting line as shown above. This fractured edge is the thumb-print identification that the halves will match each other so perfectly as to maintain shape and balance under all conditions.

The Dodge line of power transmission equipment is built to go together right and stay right under the severest service.

Call your local dealer for the immediate delivery of any Dodge products you need in building or expanding your shop.

DODGE

Dodge Sales and Engineering Company
Mishawaka, Indiana and Oneida, New York
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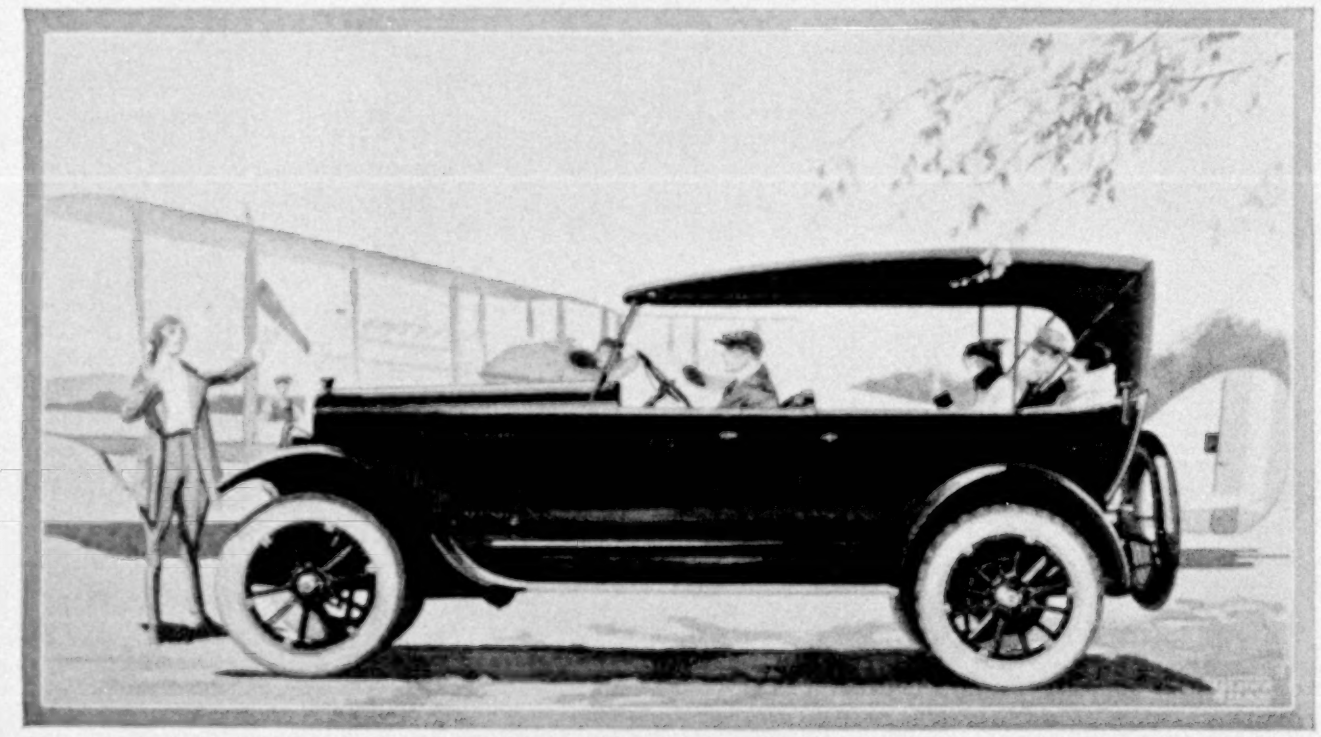
"Mention The Geographic—It identifies you"

CHANDLER SIX

Famous For Its Marvelous Motor



Chandler Leads Because of Its Real Worth

THE Chandler Six is so distinctly the leader among medium-priced high-grade cars because of its own worthiness, which for sales purposes does not need the support of exaggeration. And Chandler worthiness comes primarily, of course, from its great chassis.

The Chandler Six of today is a highly perfected development of the Chandler Six of seven years ago, which started the trend toward lightweight sixes. All the engineering skill and production efficiency at the command of the Chandler Company has been devoted to *this one chassis* and that fact is one of the reasons for the Chandler's leadership in its field today.

This isn't a claim. It's a fact, and over seventy thousand Chandler owners would tell you so if you could ask them.

All Chandler bodies are mounted on the one standard Chandler chassis. Simple, sturdy and dependable throughout, its features embrace, as for years past, the really marvelous Chandler motor, solid cast aluminum motor base, annular ball bearings, silent chain drive for the auxiliary motor shafts, and Bosch high tension magneto ignition.

Cars that May Compare with Chandler are Listed at Hundreds of Dollars More

SIX SPLENDID BODY TYPES

Seven-Passenger Touring Car, $1995 *Four-Passenger Roadster, $1995*

Four-Passenger Dispatch Car, $2075

Seven-Passenger Sedan, $2995 *Four-Passenger Coupe, $2895* *Limousine, $3495*

(All prices f. o. b. Cleveland, Ohio)

There are Chandler dealers in more than a thousand towns and cities

CHANDLER MOTOR CAR COMPANY, CLEVELAND, O.

Export Department: 5 Columbus Circle, New York Cable Address: "CHANMOTOR"

Forty million tires for 1920 What kind of tires are they

Here is a car that has run too close to the curb. Rubbing up against curbs will grind the rubber off the side of a tire, finally exposing the fabric to the action of sand and water.

A great many tires would last longer if their owners were only a little more careful not to scrape against curbs in stopping and starting.

IF the average motorist could spend an hour or two in a vulcanizing shop—watch the tires coming in for repair with all their weaknesses showing—talk to the shop manager away from the cheers of the tire salesmen—

He would see what comes of thinking too much in terms of "concessions" and "allowances."

* * *

Concessions and allowances are what the irresponsible tire dealer lives on.

He finds it easier to convince a man that he will make good on a tire if it goes bad than to convince him that it won't go bad.

What practical motorists are looking for today is good tires—not tires that may have to be made good.

And they are going more and more to the dealer whose business is based on *quality* instead of on chance.

* * *

The United States Rubber Company stands back of that kind of a dealer with all the tremendous resources at its command.

It has staked a larger investment on quality than any other rubber organization. Its first thought has always been of the tire user—putting his problem before the problem of markets.

Every important advance in tire manufacture has come from the United States Rubber Company—the *first straight-side* automobile tire, the *first pneumatic* truck tire, the *grainless rubber* solid truck tire, for instance.

The U. S. guarantee is for the *life of the tire*, and not for a limited mileage.

* * *

Nearly every man pays for U. S. tire quality, but he doesn't always get it.

If he did the country wouldn't need forty million tires this year.

United States Tires

United States Rubber Company

Fifty-three factories — *The oldest and largest Rubber Organization in the World* — *Two hundred and thirty-five Branches*

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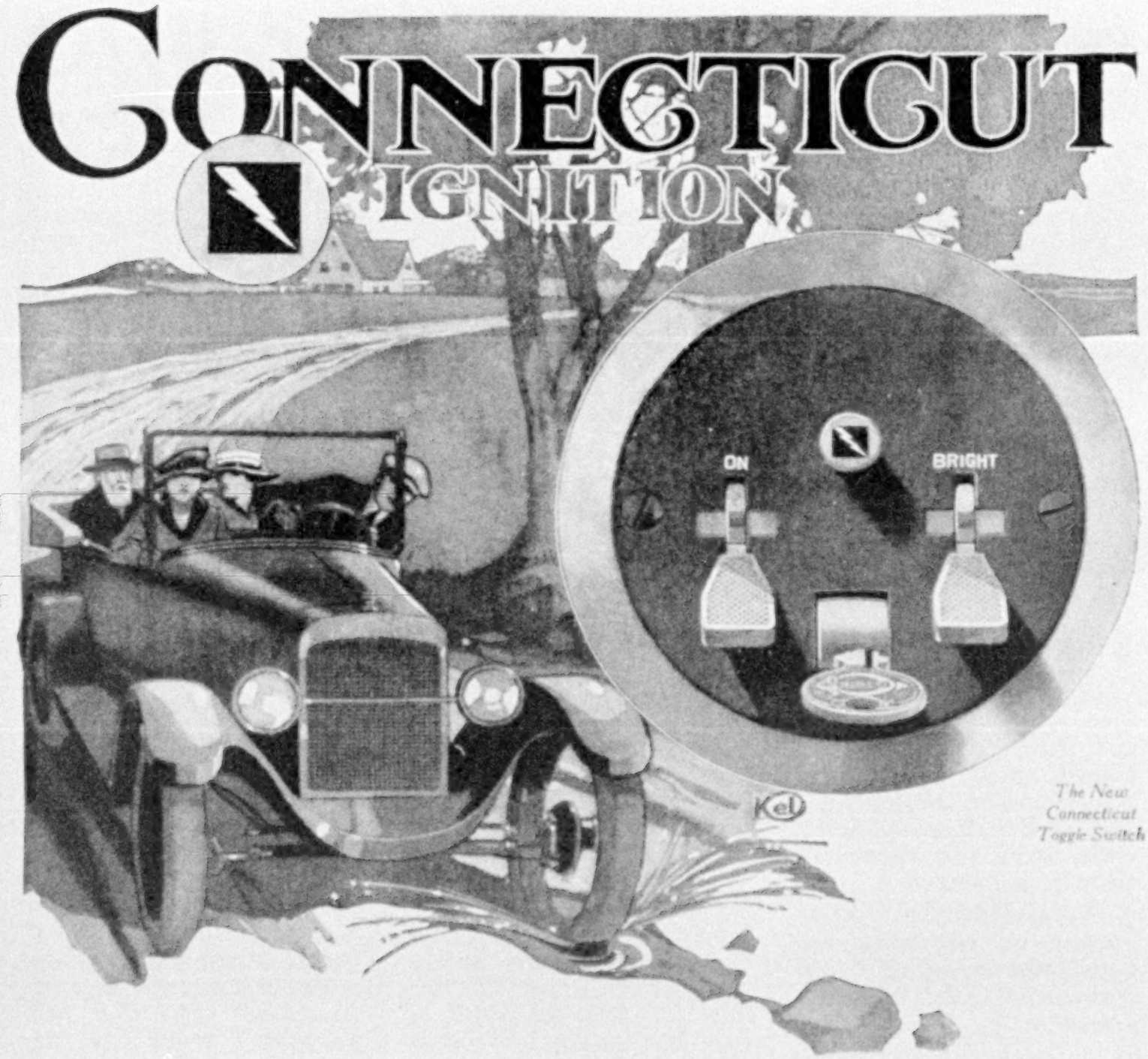
CONNECTICUT IGNITION



The New Connecticut Toggle Switch

JUST WHEN YOU NEED IT MOST!

IN "JERKY" going—where you slow down for rough spots or for puddles and start up again for smooth stretches, first one thing, then another, mile after mile—there's a demand for power that can be answered satisfactorily *only* by Connecticut Ignition. In a system which depends for an efficient spark on the speed of the motor, the current weakens when the engine "slows"—but in Connecticut Ignition the flow of current is at all times *unrestricted*—continuously giving that fat, intense spark which is a vital necessity. When no current is needed, then, and in no other system, Connecticut Ignition's automatic switch shuts it off *completely*.

Find out about Connecticut Ignition—it's worth your while!

CONNECTICUT TELEPHONE & ELECTRIC COMPANY
Meriden Connecticut

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General Motors Trucks

GMC Trucks are inherently good—the good is built into them. That is the reason why GMC users get so much good out of their Trucks. That is the reason for the satisfactory uninterrupted service which GMC Trucks give over a long period of time. Repeat orders from satisfied owners furnish the best proof of their quality.

GENERAL MOTORS TRUCK COMPANY

One of the Units of the General Motors Corporation

PONTIAC, MICHIGAN

(646)

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The Easier Kind of Coffee —No Coffee Pot Needed

G. Washington's Coffee dissolves instantly in hot or cold water. Absolutely pure, delicious coffee always. Each cup to order.

All the preparing scientifically and perfectly done by Mr. Washington's refining process—which eliminates the woody fiber, chaff and waste.

Send 10c. for Special Trial Size. Recipe Booklet Free.

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I nominate .....

Address .....

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for membership in the Society

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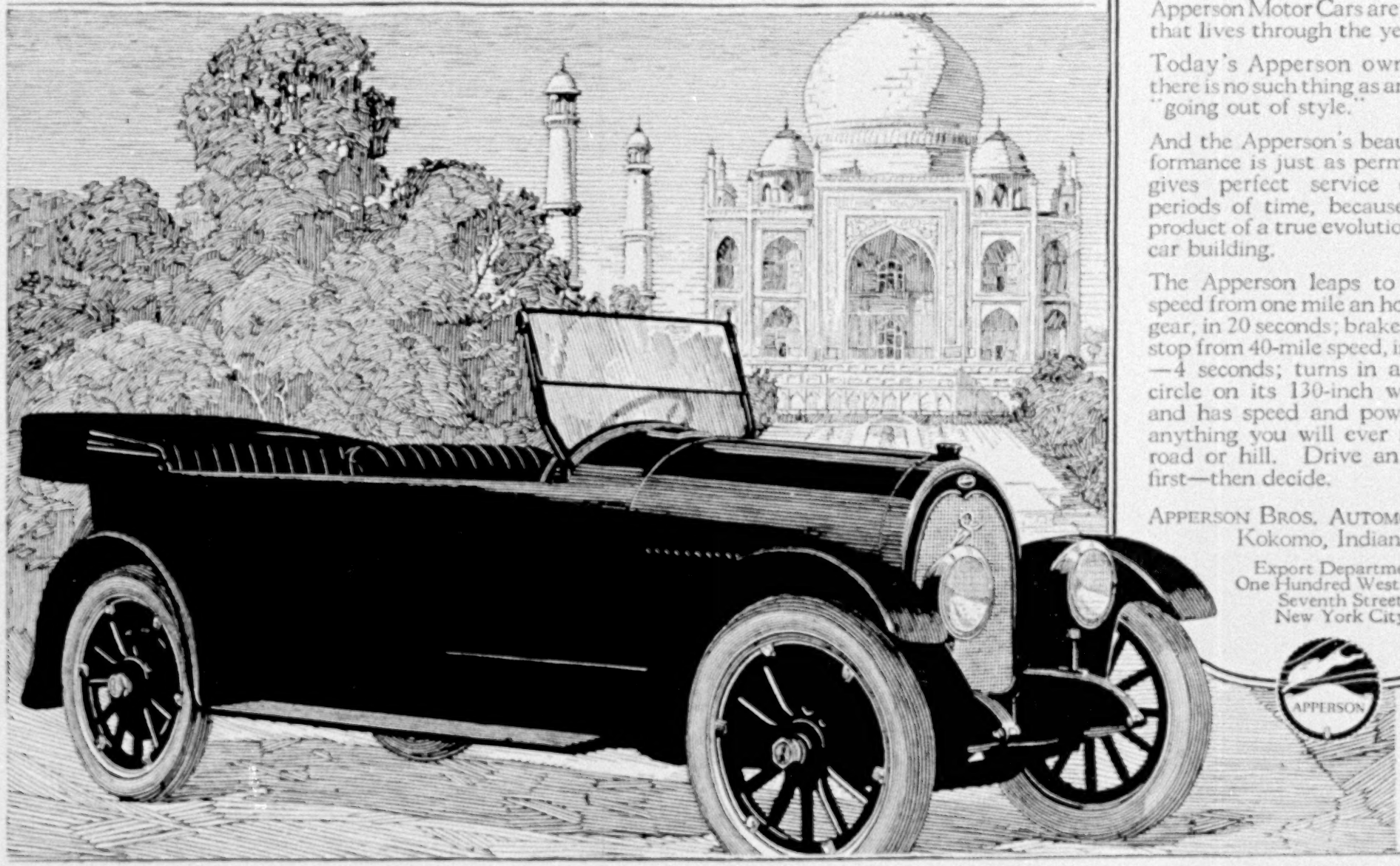
6-20 *Name and Address of Nominating Member*

APPERSON

THE EIGHT WITH EIGHTY LESS PARTS



BEAUTY THAT LASTS

Apperson Motor Cars are of the type that lives through the years.

Today's Apperson owners know there is no such thing as an Apperson "going out of style."

And the Apperson's beauty of performance is just as permanent. It gives perfect service over long periods of time, because it is the product of a true evolution in motor car building.

The Apperson leaps to a 40-mile speed from one mile an hour, in high gear, in 20 seconds; brakes to a dead stop from 40-mile speed, in 40 yards, —4 seconds; turns in a 38¼-foot circle on its 130-inch wheel base; and has speed and power beyond anything you will ever require on road or hill. Drive an Apperson first—then decide.

APPERSON BROS. AUTOMOBILE CO.
Kokomo, Indiana

Export Department:
One Hundred West Fifty-Seventh Street,
New York City

DYNAMIC AMERICA DEMANDS RESULTS. APPERSON PRODUCES THEM

Records
are Invaluable-
they must Remain Forever

Time Can't Erase Records–

That are Written With

SANFORD'S

"The Ink That Never Fades"

Sanford's Premium Writing Fluid
and Sanford's Fountain Pen Ink

If— I had only put on— WEED TIRE CHAINS

Regrets avail nothing when the harm is done.

Many an accident might have been avoided and many a life saved if drivers of automobiles had only exercised ordinary, everyday precaution and had listened to the warnings which for years have been sounded through the magazines and daily newspapers, viz.—"Always put on Weed Tire Chains when the roads and pavements are wet and slippery."

It's all very well to say, "I'm sorry — I didn't mean to do it."

Regrets don't mend broken limbs or bring back the lives that have been taken. The innocent victims have suffered through no fault of their own while the careless motorist escapes with a reprimand, the payment of Doctor's bills and the expense of having his car repaired.

Is there no way to make such fellows realize their responsibility and have ***more regard for the rights of others?***

Skidding accidents would never occur if every motorist exercised care in driving and put on Weed Tire Chains whenever roads and pavements were wet and slippery or covered with mud and slime.

In the interest of humanity — in the interest of safe and sane motoring Put on your Weed Tire Chains "at the first drop of rain," and insist that others do the same.

AMERICAN CHAIN COMPANY, Incorporated

BRIDGEPORT CONNECTICUT

In Canada: Dominion Chain Company, Limited, Niagara Falls, Ontario

Largest Chain Manufacturers in the World

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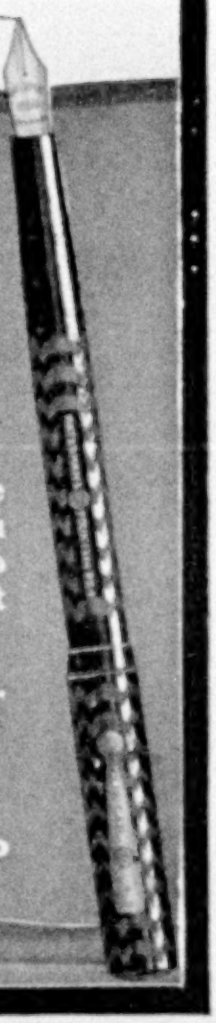
a letter a day while you're away



Waterman's Ideal Fountain Pen

supplies one of the greatest needs of the vacation season, a reliable writing implement with a self-contained ink supply that releases you from the slavery of a desk and ink well and turns all outdoors into a convenient place at any time to do all the letter writing that family ties or business and social activities demand.

Three types: Regular, Safety and Self Filling. $2.50 and up at Best Dealers.

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191 Broadway, New York

Chicago Boston San Francisco

AS A CHANGE OF DIET TRY

FIBO

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Beautiful color plates of American decorations and insignia of service, of our edible berries, and of the unique dog series by Mr. Fuertes, add to the wealth of illustration.

Children and grown-ups will read and re-read these two volumes.

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Book of Designs Free. Correspondence Invited

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"Without research no scientific discoveries or inventions have been made."
ENCYCLOPÆDIA BRITANNICA

MORE than a decade ago Mazda Service took form in the Research Laboratories of the General Electric Company. Chemists, physicists, metallurgists and engineers, coordinating and cooperating in a steady forward drive for scientific knowledge, have built the fountain-head of experience and technical skill from which Mazda Service flows. The laboratories that house it are without counterpart in the world.

Mazda Service has made possible many things. Its outstanding achievement is the Mazda lamp. The modern X-ray tube, powerful, adaptable and reliable, is another result of the search of these men for the perfect incandescent electric lamp, and the study of the thermionic emission of its filament. This is one example of the far-reaching influence of Mazda Service.

What part this influence played in the use of electricity in the war; what it has contributed to wireless communication, through the improved vacuum-tube; to surgery, in X-ray development; to the art of lighting, with electric lamps as large as melons and as small as peas; to industry and commerce, to the progress and comfort and health of humanity, is a story that has not been told.

Because it has entered deeply into everyday life, because the benefits it has brought are universal, the story of Mazda Service is worth telling, and worth hearing.

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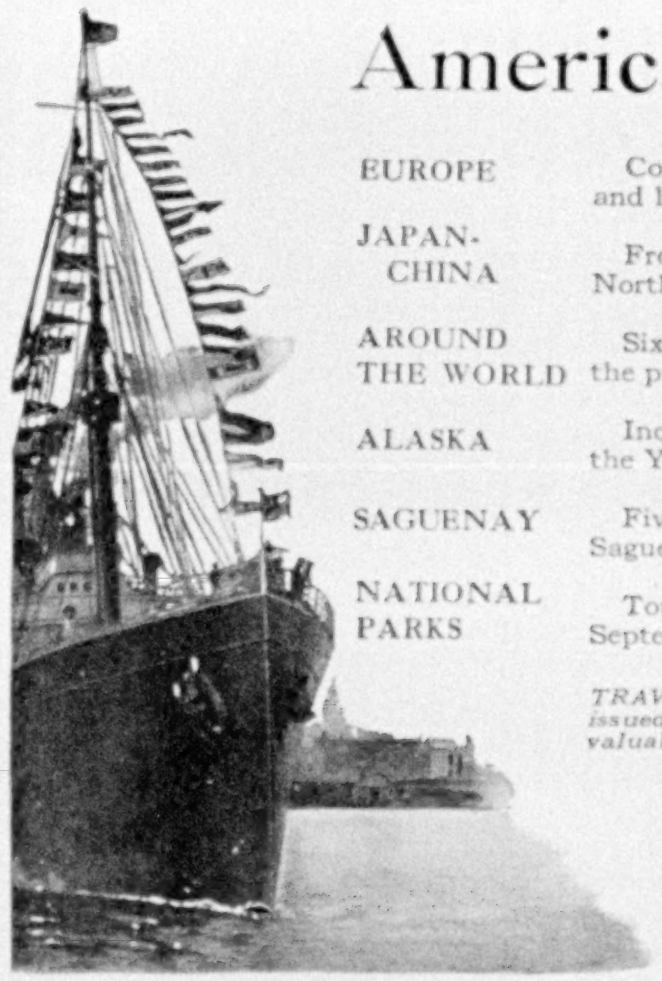

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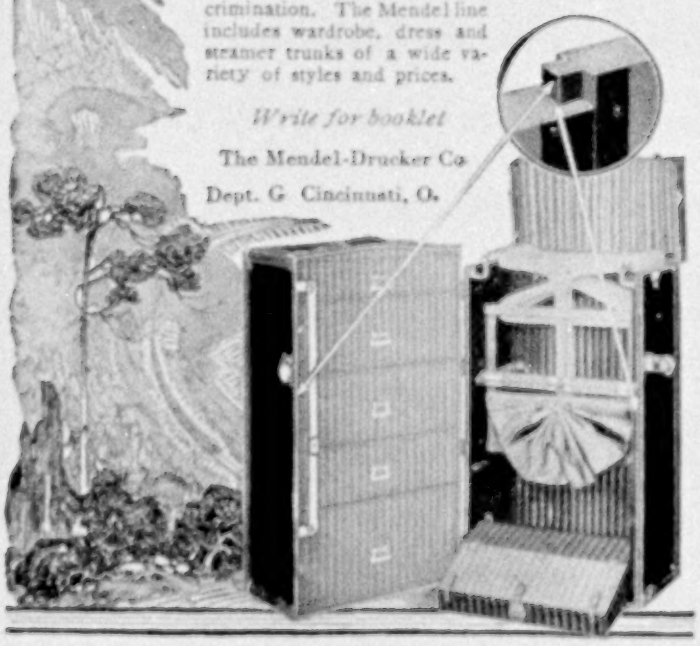

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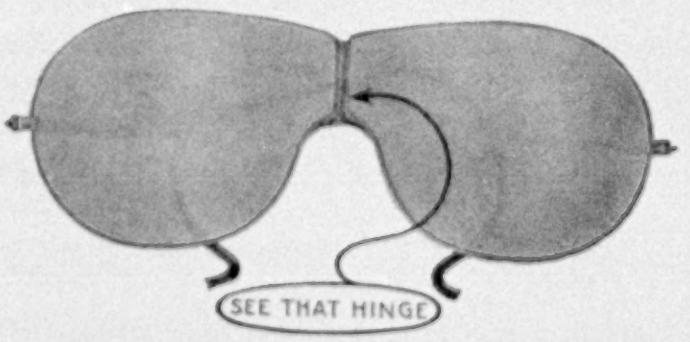

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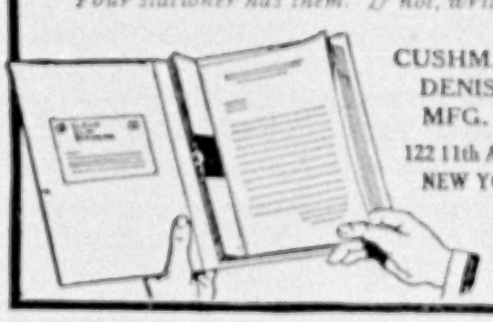

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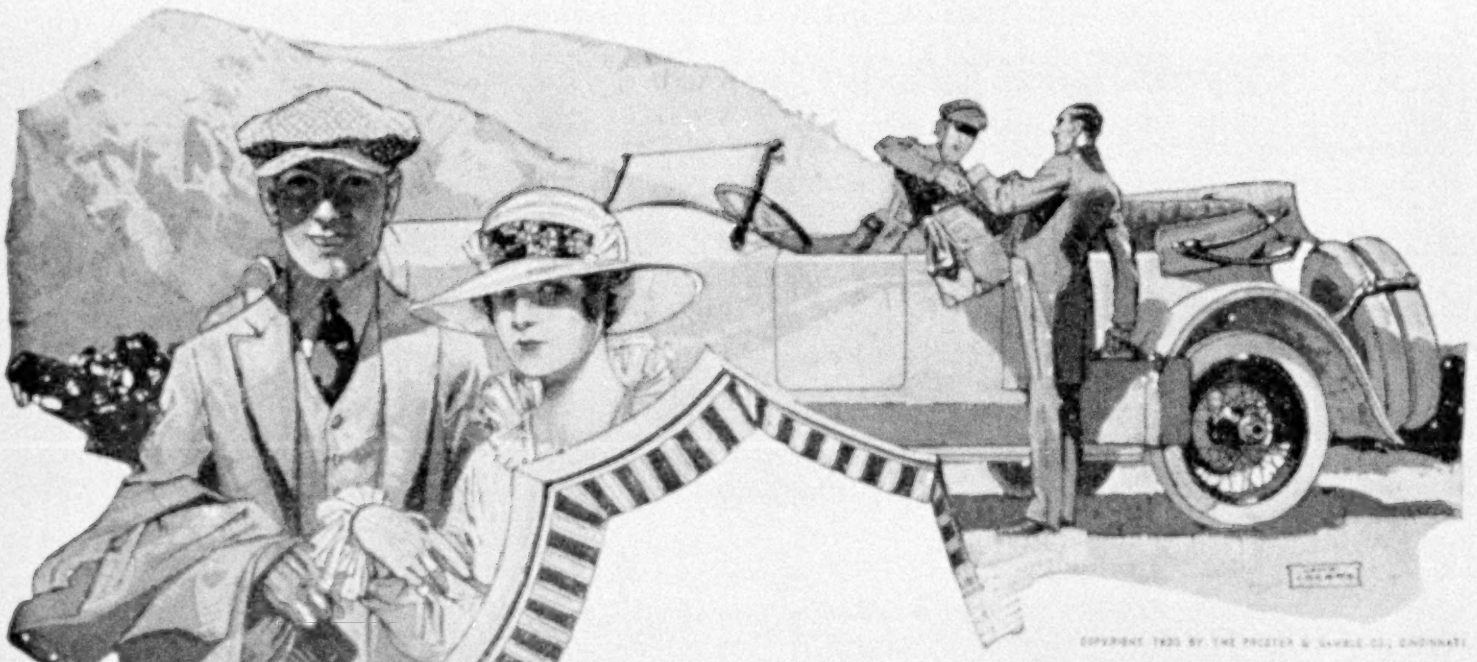

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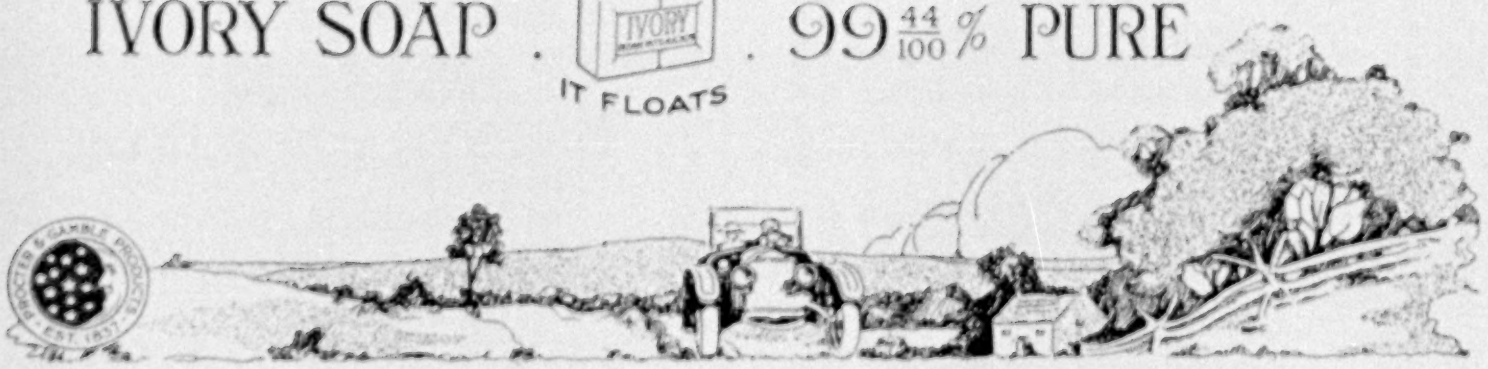

VOL. XXXVII, No. 6 WASHINGTON JUNE, 1920

THE NATIONAL GEOGRAPHIC MAGAZINE

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A MIND'S-EYE MAP OF AMERICA

By Franklin K. Lane

Formerly Secretary of the Interior

Author of "A City of Realized Dreams," "From the Warpath to the Plow," "The Makers of the Flag," "The Nation's Pride," etc., in the Geographic Magazine

AMERICANIZATION is a very broad and inclusive term. The first part of it is that we should know what America is. I find in dealing with this problem of making the foreign-born understand what Americanization is that the first great difficulty is to make the American-born realize fully and be conscious of America in all its various senses and moods and spirits. And one of the things that I should like to conduct, if I were free to do so and had the means, would be a real geography class.

We are all fascinated by pictures. Recently I have induced the motion-picture industry of the United States to enlist itself in this cause and produce Americanization pictures, and give upon its screens slogans and suggestions and apothegms that will stimulate the American ideal, because I have the notion that there is something in the United States that we call Americanism that is distinctive, that no other country has, and that it is expressed in the lives of our people, in their work, in their philosophy, in their tradition and history.

One of the pictures that I have suggested is a map of the United States, with which I find many are not familiar. Visualize the map of our country, and it will become apparent how large in material resource and how large in activity, intellectual and spiritual, the United States is.

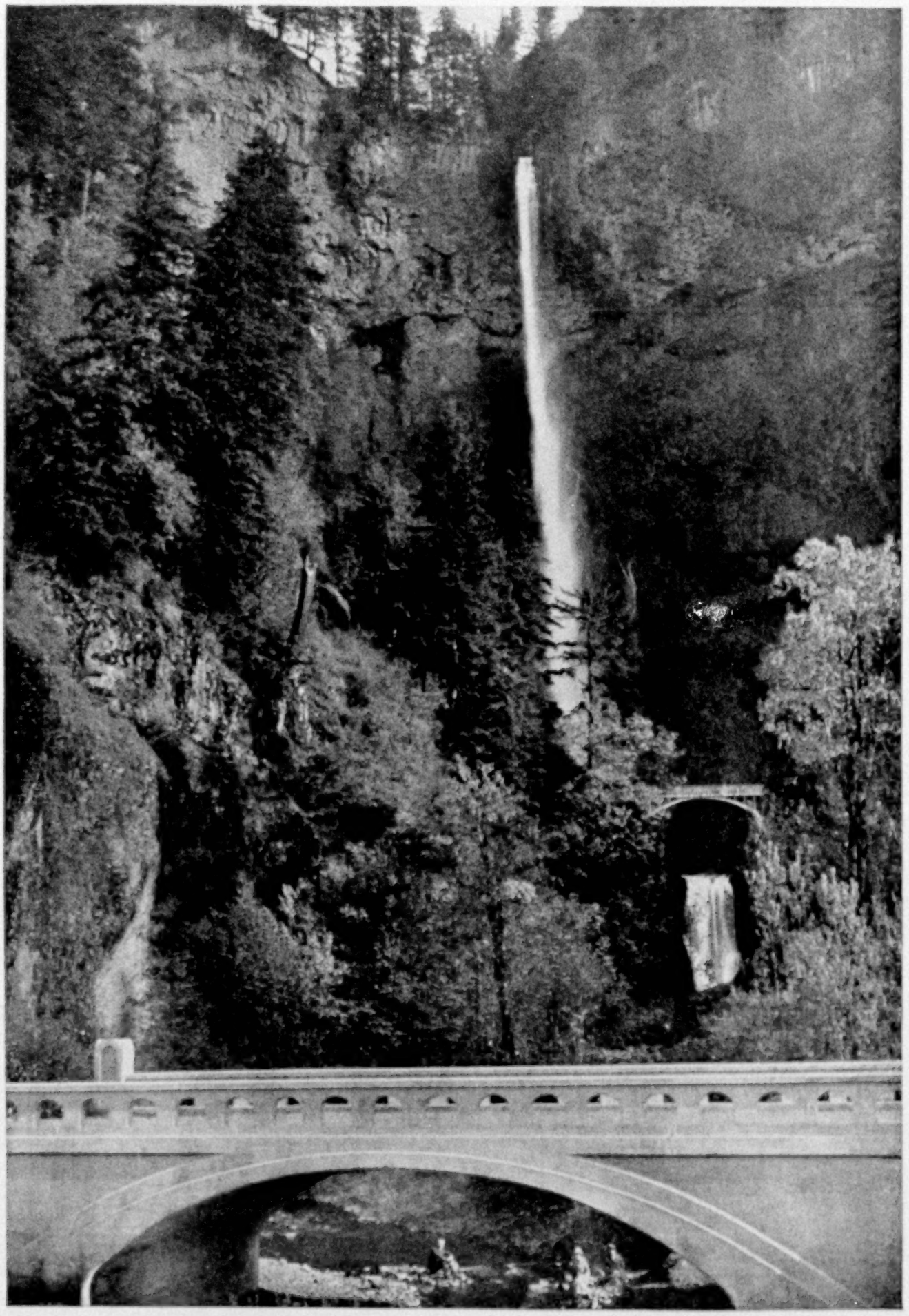
As I say, we are all fond of pictures. We love some because of their color, some because of line, some because of depth of background, some because of their historical significance, some because of the story in the picture. To me the most fascinating of all pictures is the map of the United States. Let us look for a moment at some of the remote parts of this map, and learn what is and what may be. Then we will have renewed confidence in our future.

FROM TROPIC TO ARCTIC IN HAWAII

If you go to Hawaii you will find that all of the land grants which were made originally to the chiefs, the favorites of the kings, ran from points upon the shoreline up to the top of the mountain.

You will see here a point of land running out into the sea, and there a point of land; and because they did not know the science of surveying and had to take these natural points, they drew the line straight up from these two points to the crater that was the summit of the mountain.

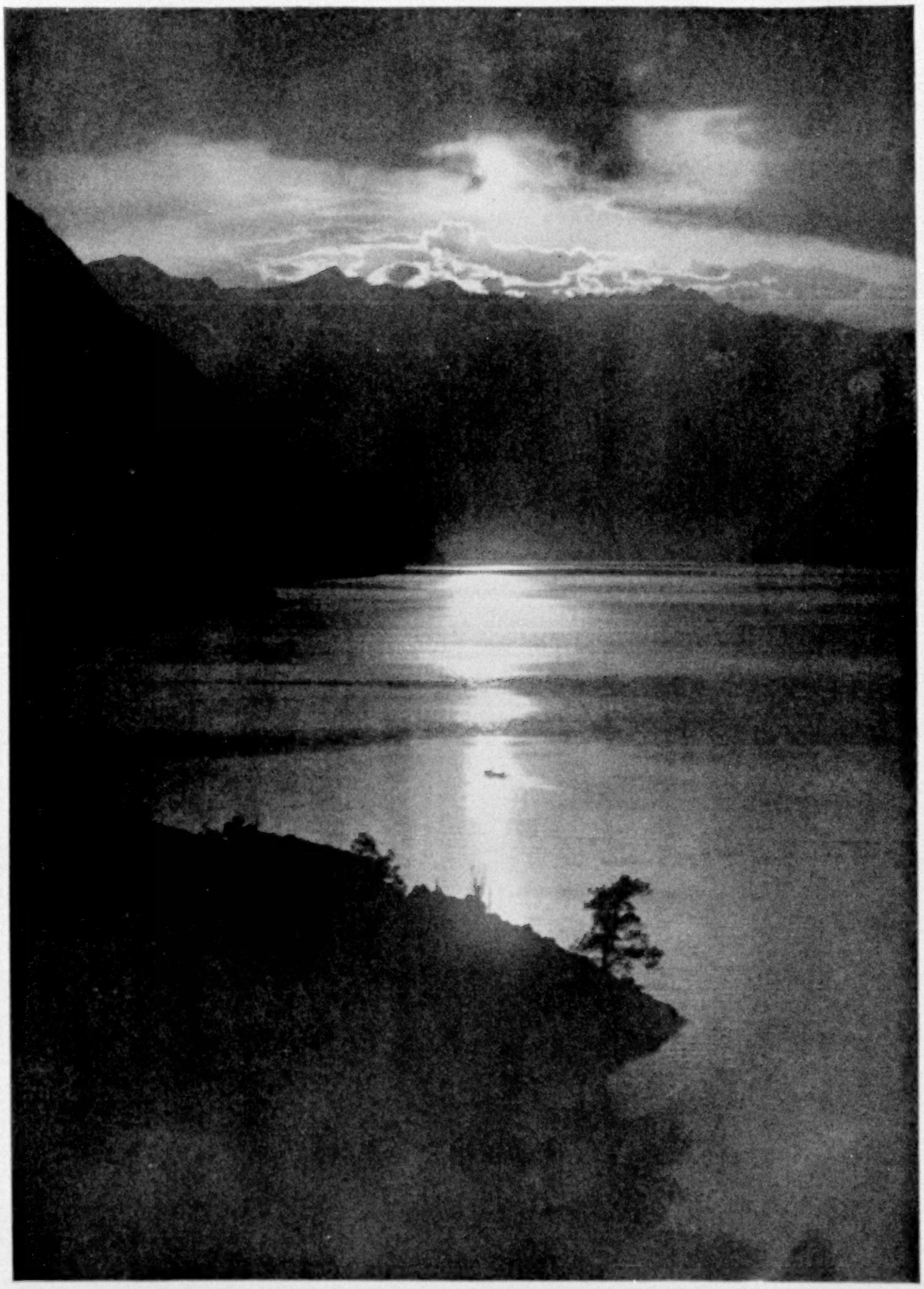
A year and a half ago I took a trip on one of those islands, and I started at the bottom, on the very edge of the sea, where the rice grows, and then went into sugar-cane, and then above into orange orchard, and then into coffee plantations, and then, all the time ascending, into fruit lands—peaches and other fruits—and then up into wheat lands, and then



Photograph from Lloyd W. McDowell

MULTNOMAH FALLS, ON THE COLUMBIA RIVER HIGHWAY

This recently completed scenic route of the Northwest parallels the picturesque Columbia River. Nearly all motor cars stop on this arching bridge, which affords a view of both stages of Multnomah Falls, with a total height of 740 feet, making this the second highest cataract in the United States.



Photograph by L. D. Lindsley

WHEN THE WATERS OF LAKE CHELAN ARE ASLEEP: WASHINGTON

This mountain gem, more than 50 miles long and from one to two miles wide, is guarded by peaks which tower from 4,000 to 5,000 feet above its waters, by turns placid and restless.

Photograph by Ansel F. Hall

THE GATES TO YOSEMITE VALLEY, CALIFORNIA, FROM THE SLOPE OF SENTINEL DOME, NEAR GLACIER POINT

Snowshoes are better than skis on such a slope as this, more than four thousand feet above the valley floor. To the right is the flat face of El Capitan. Cathedral Rocks close the view to the left. Far below is the road to the railway terminus at El Portal, ten miles down the valley of the Merced. The dog in the picture is a famous character in the Yosemite, where all other dogs are excluded. He is "Bob Townsley," the National Park Service lion tracker, and "as good a ranger as any man in the service."

into grazing lands, until I came to the snow on the top of the mountain. So that in that small tract of land, driving in an hour's time from the sea to the summit of the mountain, one sees everything that can be produced, from the tropics to the Arctic Circle.

That segment of that island gives a picture of the United States, because we have capacity in this country to produce all of those things which man requires, either in the temperate or the semi-tropical zones or even in the eternal snows of the north.

ALASKA'S NEW RAILWAY

In Alaska we are building a railroad; it is almost built; five hundred miles long, running from the sea straight north to Fairbanks and into the Arctic Circle. That is a government enterprise. The road is as well laid as the Pennsylvania. It has been built, without graft and without pull, out of government funds for the benefit of that territory, so that it may be opened up.

The very far end of Alaska is Seward Peninsula. Worthless? It looks so. Yet a woman came in to see me some time ago carrying a receipt for forty thousand dollars' worth of tin that she had got out of a river bed there.

THE REINDEER AND THE MUSK-OX

This side of Seward Peninsula we have the great grazing grounds of the reindeer. Twenty years ago a man conceived the idea that the Alaskan moss would support Siberian reindeer. He brought 1,200 animals over; that herd has multiplied until it is now 165,000. They feed on moss all the year round. Eskimos guard them.

The other day Stefansson, who made that great swing around North America, and added one hundred thousand square

Photograph by Ansel F. Hall

HALF DOME AND CLOUDS REST, YOSEMITE NATIONAL PARK: CALIFORNIA

The photograph was made December 13. Note the chief ranger's winter costume—bare head, short sleeves, no coat or gloves. Snowshoeing with fifty pounds of weather instruments is more *work* than *art*.

miles to the world's known area in the Canadian Arctic, while living for five and a half years on the resources of the frozen north, called upon me and said that in the northern part of Canada the musk-ox flourishes.

The musk-ox is valuable for its hide, its superb wool, and its meat, which is very much like beef. It costs nothing to support, because it feeds on the grass that grows in between the moss throughout tens of thousands of square miles of northernmost North America.

MEAT SUPPLY FOR THE FUTURE FROM ALASKA'S EMPTY SPACES

Stefansson urged me to procure a ship, load it with musk-oxen, and carry those musk-oxen over into Alaska and let them feed with the reindeer, because they are not competitors but co-operators, feeding off different things. He emphasized the fact that the musk-ox and the reindeer are not enemies, for they learned to live together long centuries ago; and if we could fill up the empty spaces of Alaska with these two species we would have a supply of meat that would provide for the whole Pacific coast.

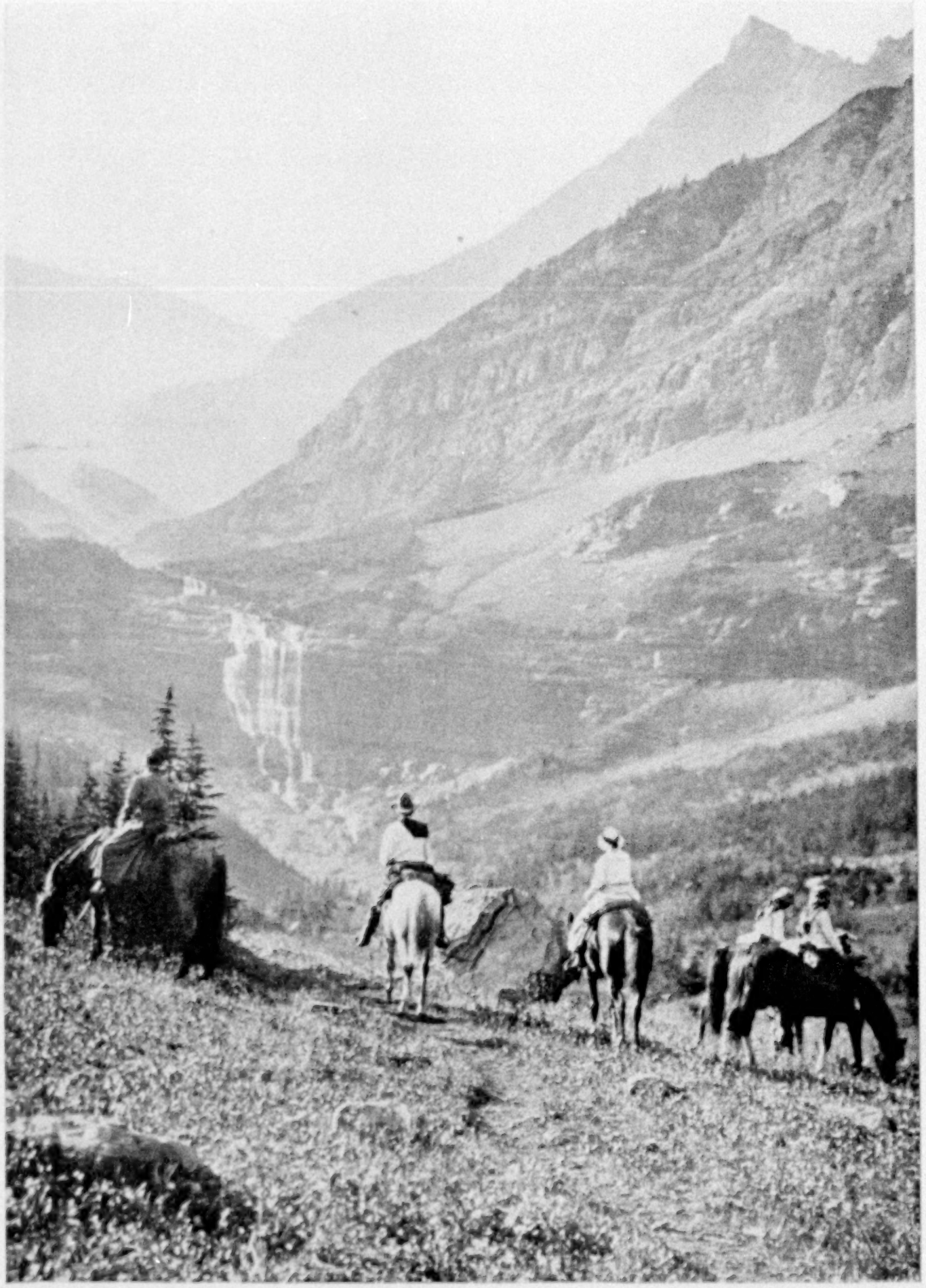
OTHER ALASKAN TREASURES

Copper! The second greatest copper mine in the world is in Alaska.

Mount McKinley National Park! The greatest protected area in the world for the mountain sheep and the caribou.

Gold! Once mined abundantly, but gold cannot be mined in Alaska now. Although thousands of miles are underlaid with gold, the mines are closed for a very singular reason. It does not pay to mine gold. Labor is so high, material is so high, that when you get the gold from the ground at the standard price fixed by the Treasury, you do not get your money back. I suppose this is the first time in the history of the world when mines of gold have been closed down because it does not pay to operate them.

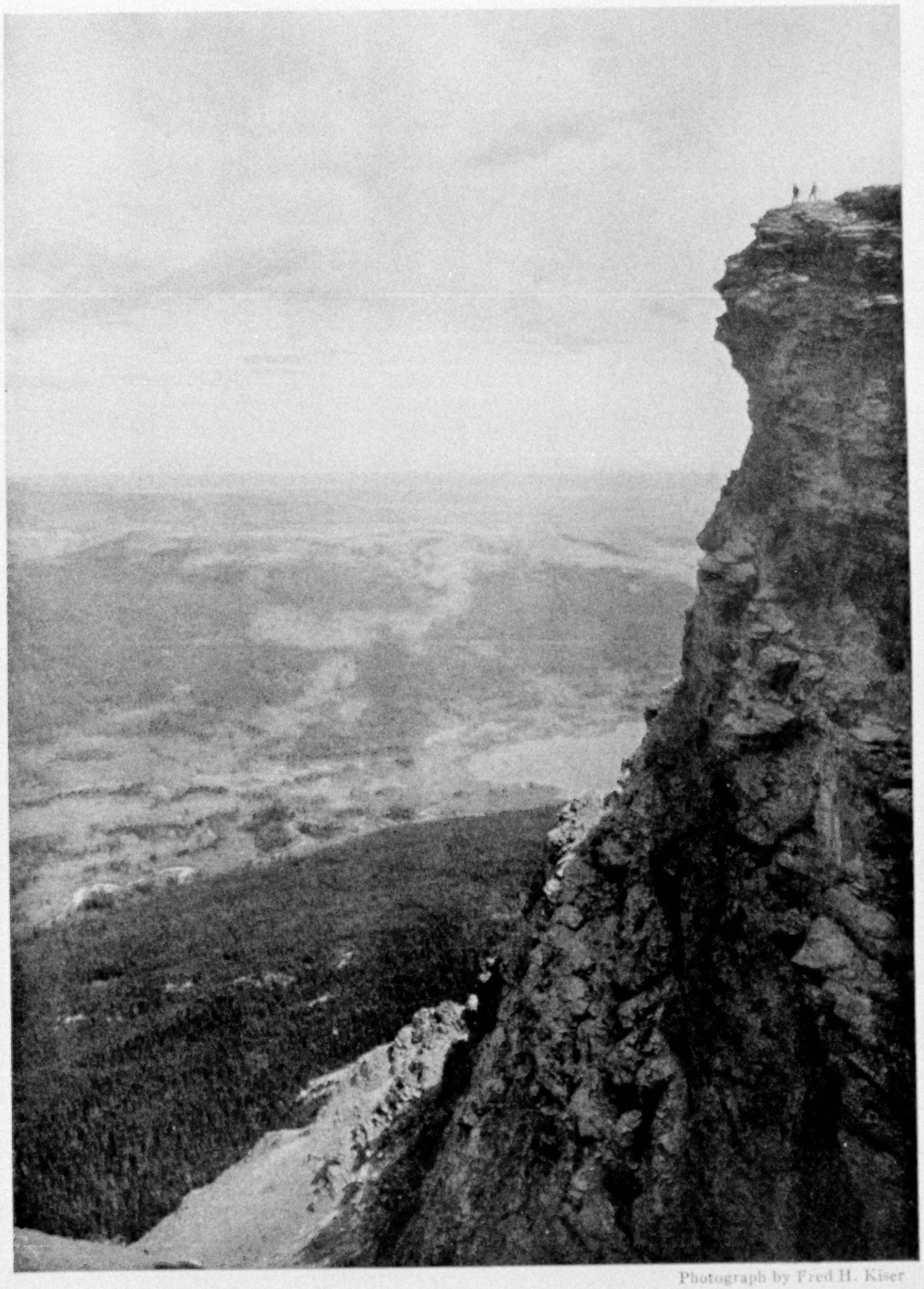
As you come down out of Alaska you find the fishing industry, which will be



Photograph by Gilbert Grosvenor

THE OPEN TRAIL IN GLACIER NATIONAL PARK: MONTANA

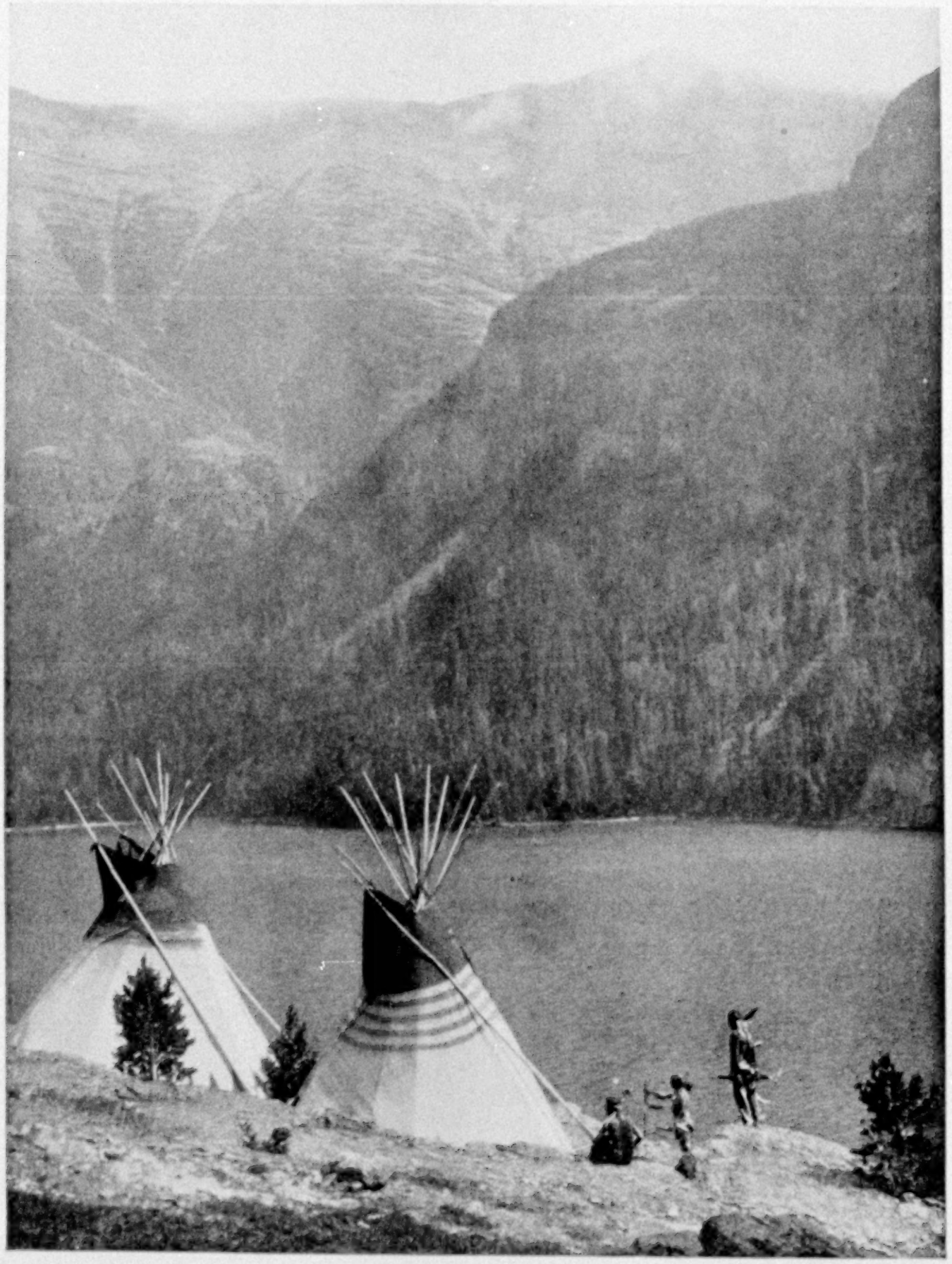
A transcontinental railway parallels the southern boundary of Glacier and an automobile highway connects the outside world with beautiful McDermott Lake, but the main attractions of this great playground are the trails that lead from one group of comfortable chalets to another, thus opening to the traveler on foot and on horseback unsurpassed views of mountain and waterfall, lake and glacier.



Photograph by Fred H. Kiser

SUMMIT OF APPISTOKI MOUNTAIN, WITH TWO MEDICINE VALLEY 3,000 FEET BELOW, GLACIER NATIONAL PARK: MONTANA

Although this national park still has 60 small glaciers at their painstaking task of sculpturing the mountains, Two Medicine Valley represents the completed product. High precipices and irregular lakes occupying the deeply carved portions of the valley distinguish the impressive landscape.



BLACKFEET INDIAN TEPEES ON THE SHORE OF ST. MARY'S LAKE, WITH RED EAGLE MOUNTAIN LOOMING IN THE BACKGROUND, GLACIER NATIONAL PARK: MONTANA (SEE PAGE 501)

Not many years ago this region was the favorite hunting ground of the Blackfeet tribe. Copper was discovered here in 1890, and there was a great rush of prospectors. Six years later Congress bought the land from the Indians, but as a copper region it proved disappointing. In 1910 it was set aside as a national park. The variety and majesty of its scenery and its ready accessibility, owing to its situation adjacent to one of the great transcontinental railway lines, have resulted in its ever-increasing popularity with the American people.

supplemented in time by another great industry, the vegetable-canning industry. I should not be surprised to find the peas of the future raised in that snowbound country and canned there. The finest turnips that I have ever eaten and the largest and crispest celery came from Alaska. And there is a territory of 600,000,000 acres almost untouched that belongs to your Uncle Sam.

THE WONDERFUL STATE OF WASHINGTON

You come on down the coast to the State of Washington. There we have at one point the largest rainfall of any point in the United States—150 inches. And on the other side of the State is or was the great desert of the Columbia basin. Land that I could have bought for $1.25 an acre is today selling for $1,000 an acre. Why? Because we have invested a little money in taking the waters that flowed down from Mount Tacoma (or Mount Rainier) and, turning them upon that land, have planted apples. One of the apples planted here comes from the Hudson River. The people of New York State did not care for and love this fruit as those people did out there. They have taken the Delicious apple as you know it, pruned it, watered it, sorted it, cared for it, until now it makes that land worth $1,500 to $2,000 an acre.

The dominant feature in the landscape in the State of Washington is Mount Rainier. I like the name Tacoma because it is an Indian name. Rainier was the name of an admiral who saw this splendid place. Tacoma was the Indian name and means "The feeding breast"; and when you see the mountain you will realize where the Indians got that name, because from every side come down rivers which make for the strength, the beauty, and the wealth of the country.

Here is one of our great parks; and I have stood therein with the snow of the glacier in one hand, and touched with the other the blossoming wild flowers.

THE STATE'S GREATEST TREASURE

That State is rich in mines, rich in agricultural land, rich in power possibilities. It has hundreds of thousands of acres of land that are practically desert and that can be reclaimed and brought into usefulness by use of the water of the Columbia River.

And yet the most significant thing in that State is the State University. I saw Seattle when it was a frontier town, and there was little thought then of its possessing a great university; but there are 6,000 students in the University of Washington today, and that State is only 30 years old. This fact indicates better than anything else can the trend of American life. America has in her mind the purpose to do things that make for a richer country not only materially but also intellectually.

You come down from Washington to Oregon, with its long line of mountains, its majestic river, its vast forests. There is one outstanding scenic feature of novelty, Crater Lake. The top was blown off a volcano, and in the center of that crater we find the most exquisite bit of water—a thing without parallel in color in this country, perhaps in the world.

And there is abundant land yet to be had "where rolls the Oregon." We have recently brought back to the United States a strip of land ten miles wide and 300 miles long which was granted to the Oregon and California Railroad, and that land has been thrown open to homesteaders.

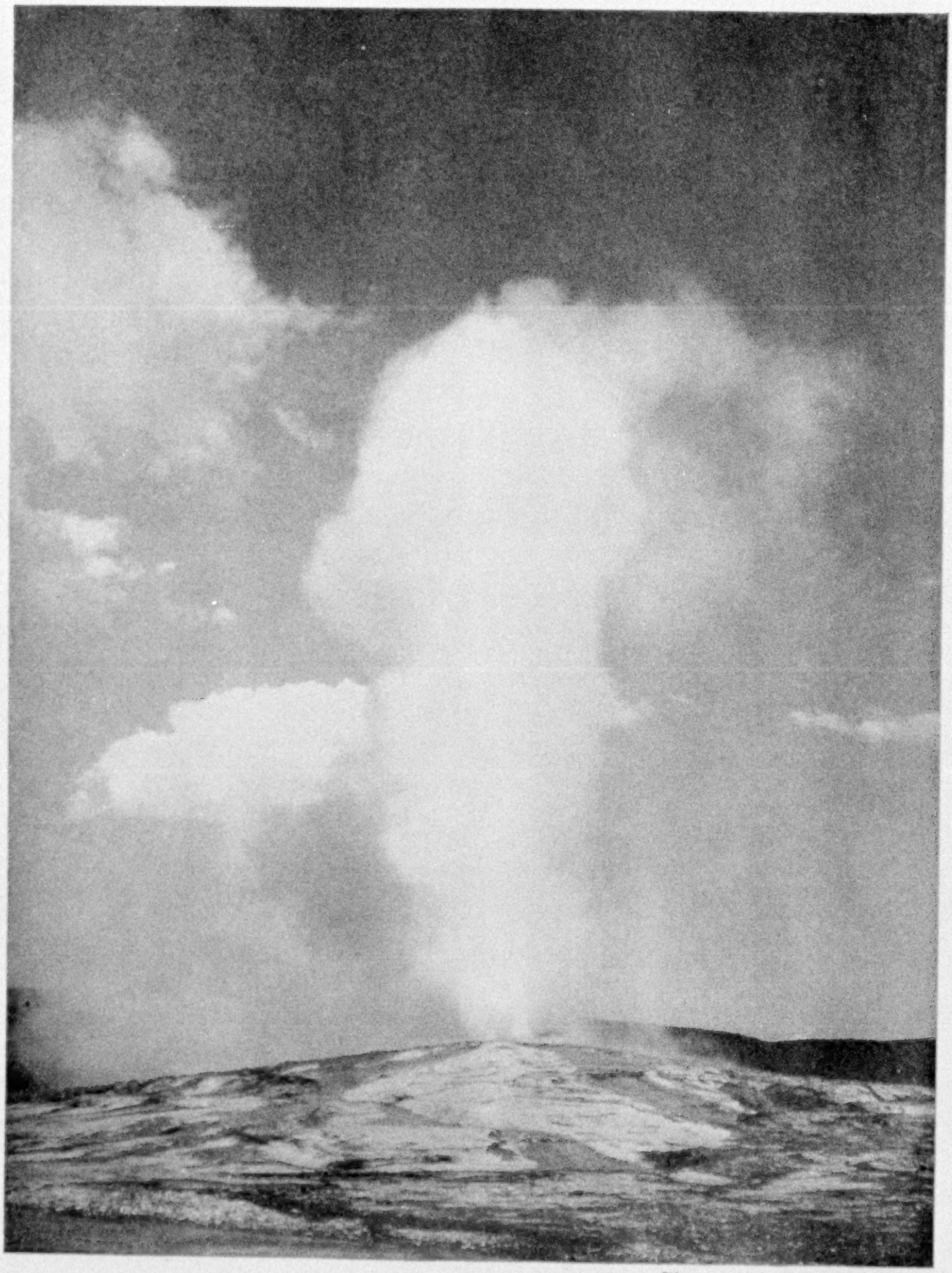
WHY THERE ARE "CALIFORNIACS"

Go farther south and you come to California. Being a Californian, I must speak with some degree of modesty regarding that State, though that is said not to be characteristic of the Californian.

Let me tell you a story: I went over to Baltimore to speak to a Methodist conference some time ago. I met there a splendid-looking man, with a long, flowing, white beard, and I said to him, "Do you preach in this section of the country?" He said, "Yes, sir; I come from the Eastern Shore of Maryland. Have you ever been on the Eastern Shore?"

I said, "No; I am sorry to say that I have seen every other beauty spot in this country, I believe, but I never have seen that."

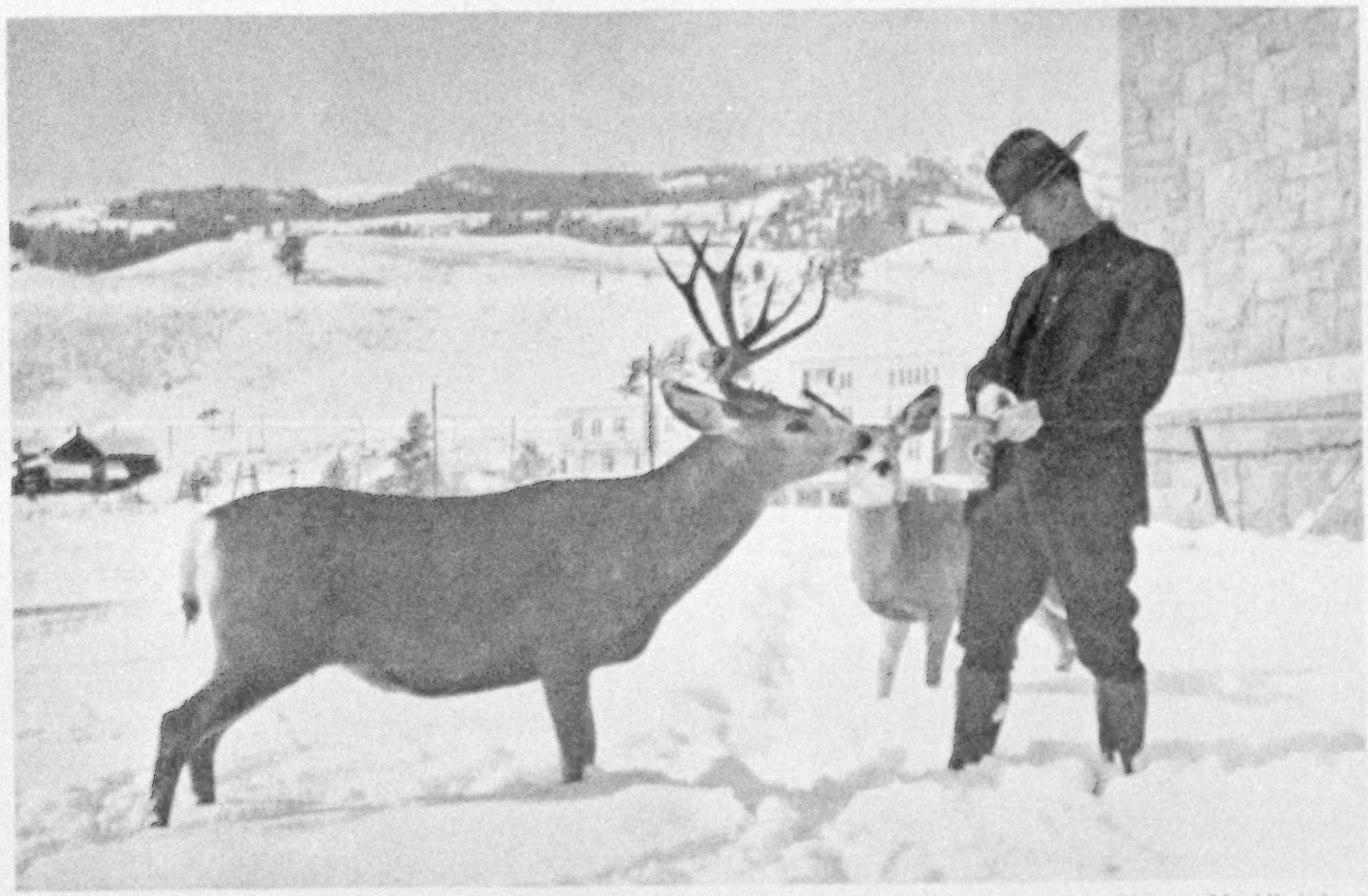
"Well," he said to me, "we love that country. I have been preaching there for 66 years. We are a strange people and we have some strange legends, and one of them is that a long, long time ago, when Adam and Eve lived in the Garden of



Photograph by Albert Schlechten

"OLD FAITHFUL" GEYSER, YELLOWSTONE NATIONAL PARK: WYOMING

That dependability in Nature is not without its reward is proved by the love of the farmer for his fertile fields and by the age-old worship of the never-failing sun. In the greatest geyser field in the world, one has won greater honor than the rest. They do not call this one "The Brilliant" or "The Giant," but "Old Faithful." For many years it played with great regularity every seventy minutes, but during the summer of 1915 the interval lengthened to eighty-five minutes, owing, it is supposed, to the smaller snowfall and consequent lessened water supply of the preceding winter.



Photograph from Horace M. Albright

FEEDING TWO DEER IN YELLOWSTONE NATIONAL PARK: WYOMING

Last winter many of the wild animals in America's largest national park suffered severely. Here one of the rangers is feeding two of the shy, graceful deer which, under the protection of the government, have become partly domesticated.

Eden, they fell sick, and the Lord was very much disturbed about them, and he called a council of his angels and wanted to know where they should be taken for a change of air, so that they might improve.

"The Angel Gabriel suggested that they should be taken to the Eastern Shore of Maryland, and the Lord said, 'No, no; that would not be sufficient change!'"

It is somewhat in that same spirit that every Californian speaks of California, and that is the reason why one of us has given the name of Californiacs to all those who are expatriated like myself.

THE RÔLE OF THE PADRES IN DEVELOPING CALIFORNIA

California was peopled by the Indians first and followed by the padres, and it is a strange thing that wherever the Catholic Church has gone in that State you will find a most fertile spot. The rich centers of California are all gathered around those exquisite missions which those beloved fathers taught the Indians to build.

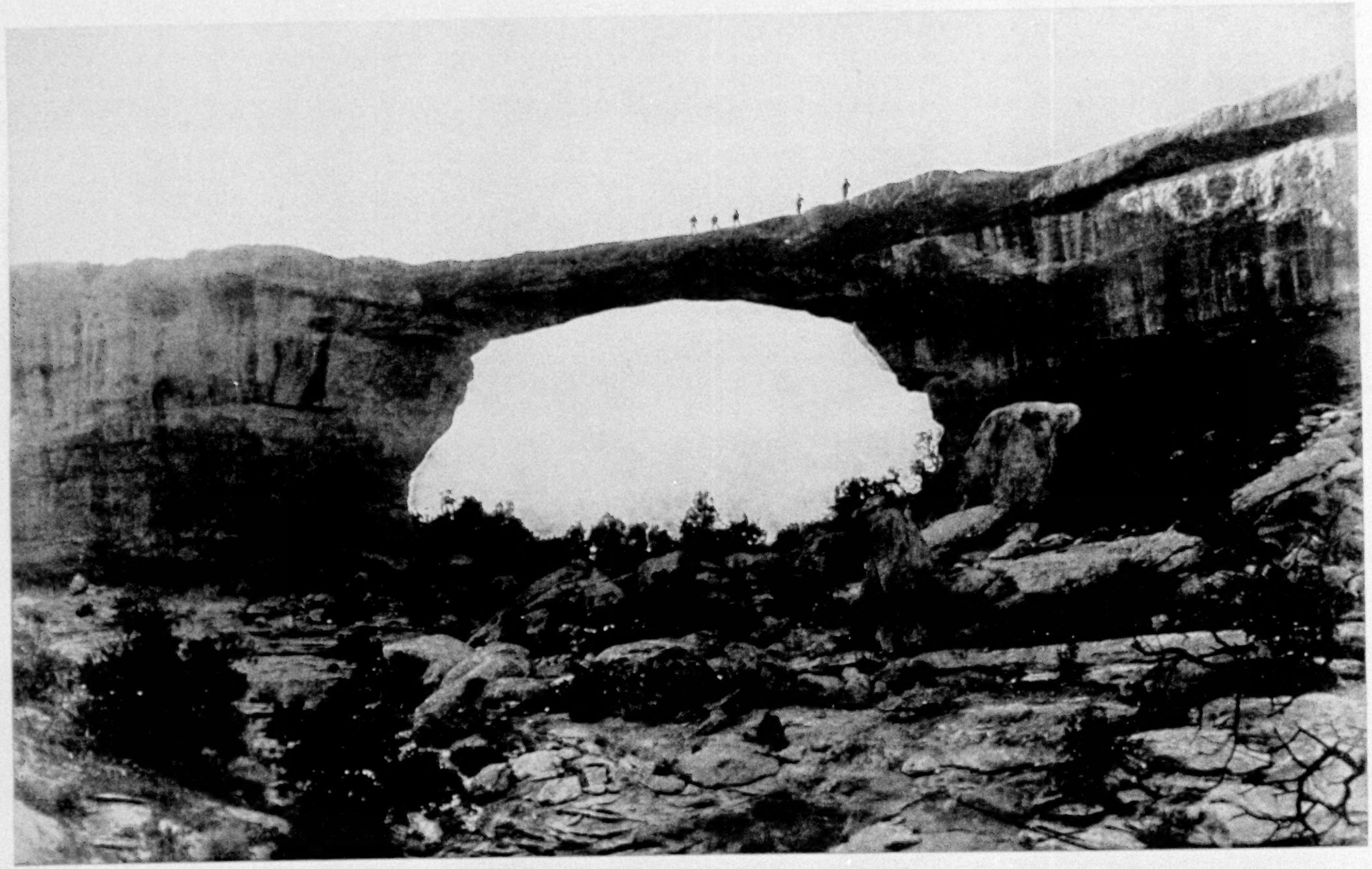
The Mission Fathers brought with them the art of irrigation, which was a new art to this country; and they brought their sprigs of vine and of orange and of fig and laid the foundation for the wondrous productions of that State. So that today you will find from the very northernmost part—from Klamath Lake, on the edge of Oregon—down to the Imperial Valley, in the south, the lands of California watered and made as fertile as the valley of the Nile.

As you journey down the State you see some of those superb things that God has made for the delight of his people—Mount Shasta, the Yosemite Valley—yes, and the great redwood trees, the oldest living things on this or any other continent. They were there, those great sequoias, when Christ came upon earth; they were there when Moses brought down from the mountain the tables of stone—five thousand, six thousand and more years old. And because of commercial reasons—out of the mere desire for railroad ties—people are cutting

© Haynes (St. Paul)

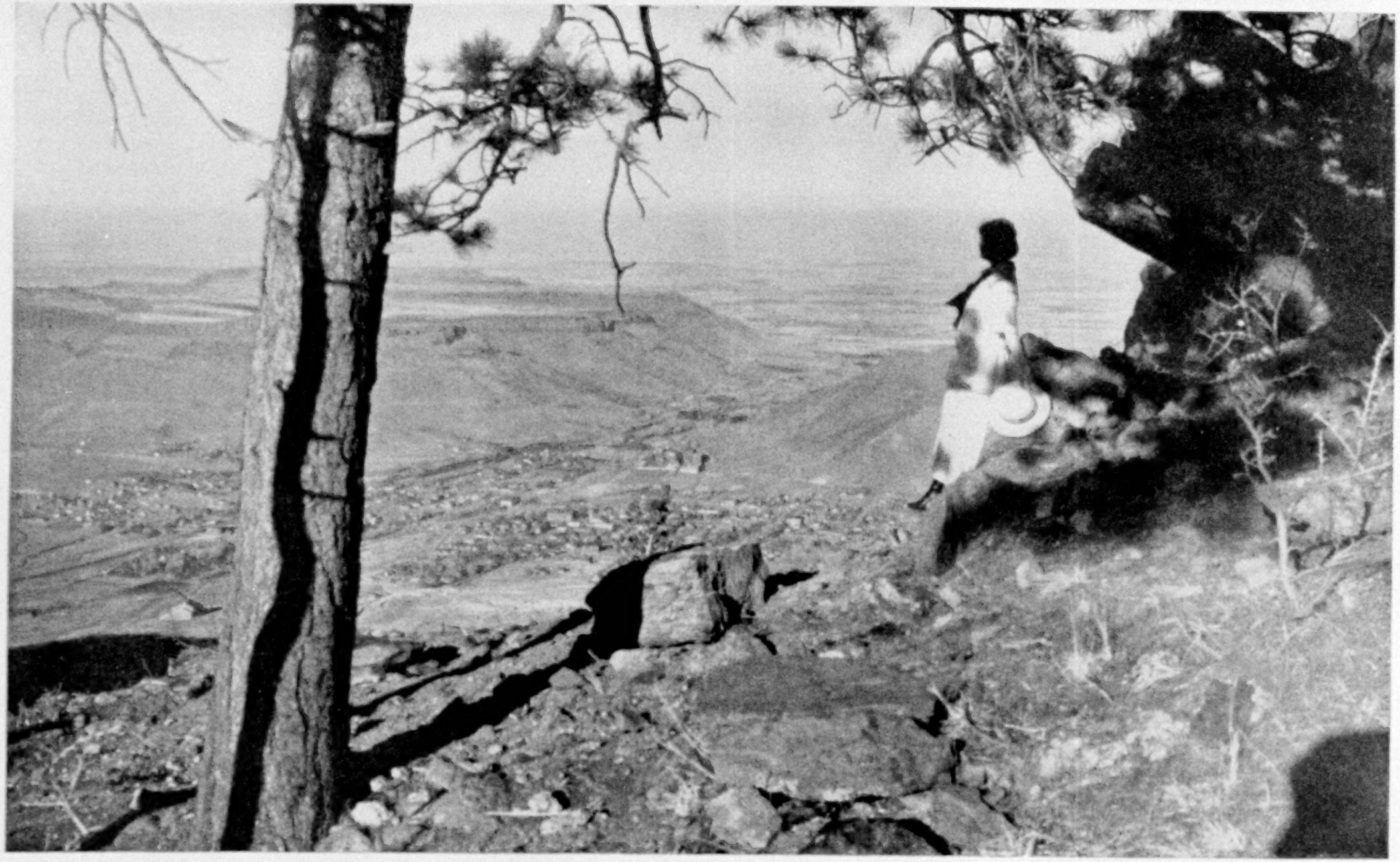
AT THE BUFFALO FARM: YELLOWSTONE NATIONAL PARK: WYOMING

No longer are the western plains crowded with herds of bison, but in the Yellowstone these one-time lords of the prairie have found a sanctuary where they thrive and multiply. Here the visitor finds one of the finest fields for nature study in the world, for wild animals of many species have become accustomed to the presence of friendly men.



ONE OF THE THREE CHIEF ATTRACTIONS OF THE NATURAL BRIDGES NATIONAL MONUMENT: UTAH

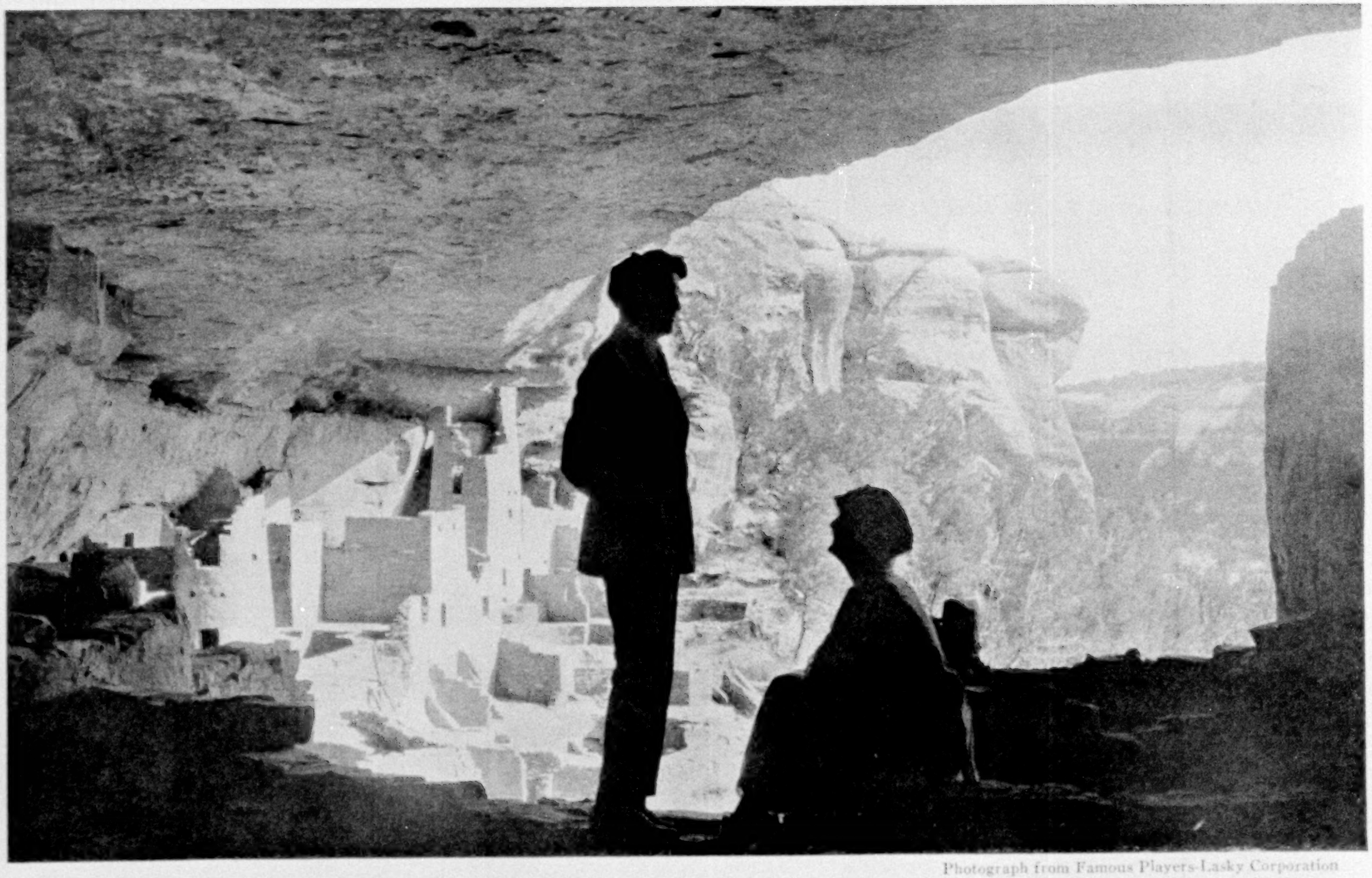
This massive span of rock, the Edwin, constructed by Bridge-Builder Nature, stretches 111 feet above the ancient river bed. The extreme width of the archway is 205 feet. The Augusta Sandstone Bridge, near by, has a height of 265 feet and a width of 320, compared with the Natural Bridge of Virginia's height of 215 feet and span of 90 feet.



Photograph by Wiswall Brothers

TAHOSA VALLEY FROM LOOKOUT, ROCKY MOUNTAIN NATIONAL PARK: COLORADO

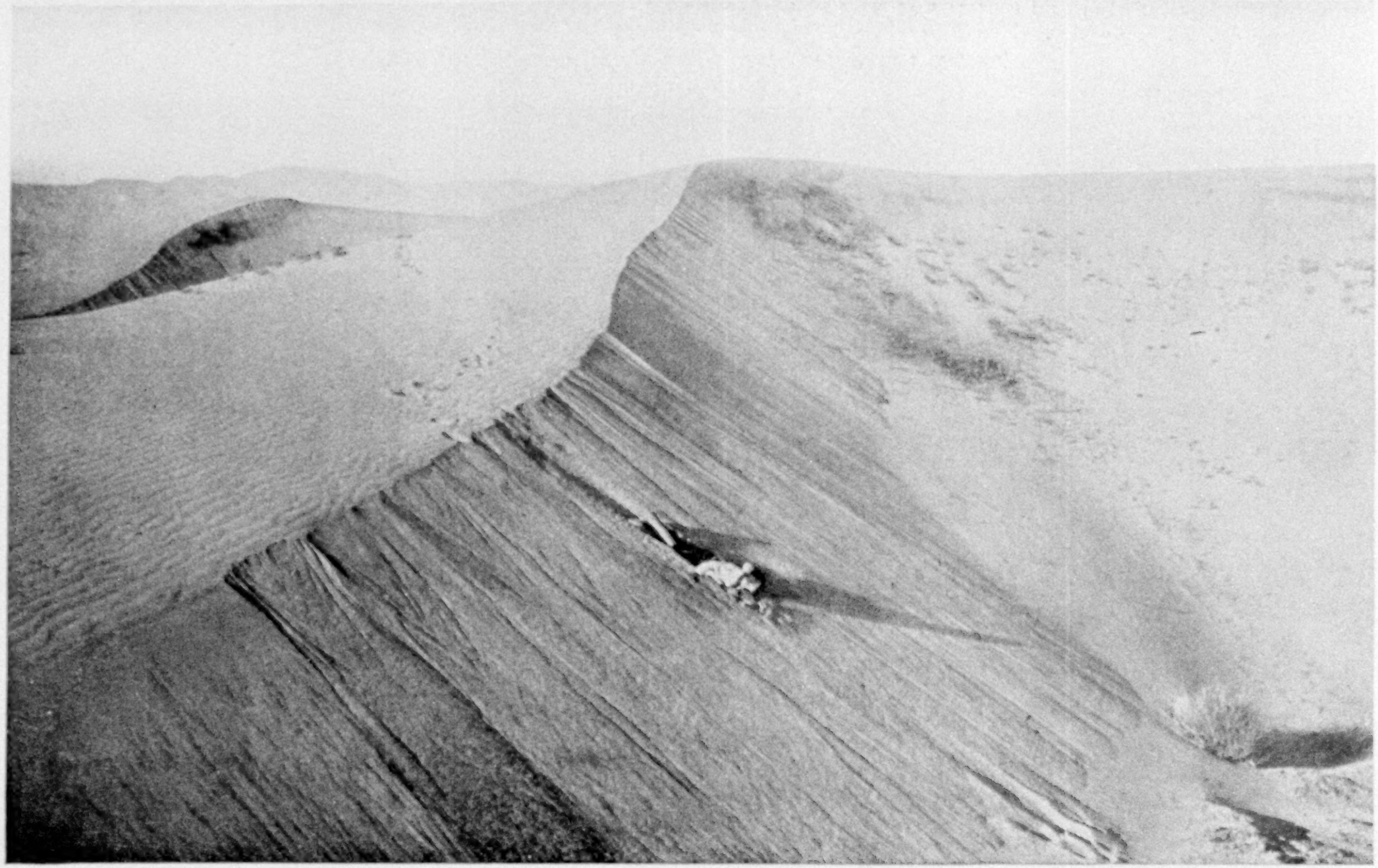
The region now embraced in this matchless playground and geological wonderland was once a famous hunting ground, and an Englist nobleman tried to buy it some years ago with a view to converting it into a private game preserve; but in 1915 it was created a national park, the thirteenth in America's growing family, which now numbers nineteen



Photograph from Famous Players-Lasky Corporation

THE CLIFF PALACE, MESA VERDE NATIONAL PARK: COLORADO

From this elevated home site the cliff-dwellers looked out across the deep canyon in whose shadowy depths they raised their corn. The group of about 200 rooms is divided into four quarters. Nearly 50,000 acres have been set aside as a national park to preserve the antiquities which remain from an earlier civilization.



Photograph by J. Smeaton Chase

"HITTING THE GRIT": A SAND-DUNE PASTIME IN COLORADO

Like the sand seas of the Sahara and the medanos of Peru, which march uphill at the rate of a mile and a quarter a century, the dunes of the Colorado Desert provide a weirdly impressive landscape. Here, however, the tobogganning possibilities of the topography appeal to youth more strongly than does scenic charm.

down those trees and have been doing so for years until now we have organized what we call a Save-the-Redwoods League, and we hope to raise enough money to save a strip of redwood along the great highway that leads from San Francisco up to the Oregon border, probably, when it is developed, the finest single bit of coast scenery in the United States, perhaps anywhere, bordered on both sides by these magnificent trees.

The destruction of these forest giants is a cruel thing. I cannot speak of it without some degree of emotion. Commercialism has its benefits, but commercialism can be a curse when it destroys things of beauty and things that cannot be replaced. We have saved Yosemite Valley. We have a park called the Sequoia National Park, in which the greatest redwood trees are preserved, and we want to expand that park and give it a new name—make it larger and call it Roosevelt Park.

THE MOST PRODUCTIVE LAND IN AMERICA

You go down farther to the edge of Mexico and you will find the Imperial Valley, which was once an inland sea and came very near being an inland sea again ten years ago, when the waters of the Colorado broke through the protecting barriers and flowed down into the valley. Here are 300,000 acres of desert land that now is the most productive single piece of land in this country, because the waters of the Colorado, rising in Wyoming and Utah and Colorado, have been brought and turned on to that land.

Across the way, in Arizona, is another irrigation project—Yuma. Yuma has been noted for but one thing, its heat and the piercing quality of its sand, which drives into your face; but Yuma is being turned now into one great garden.

The government recently offered for sale some of the public lands on what is called the Yuma Mesa, and men offered $250 and $260 an acre for that land, barren as it is, but with the water right promised for the future.

A CAMPAIGNER IN THE WEST

I knew Vice-President Stevenson somewhat, and talking one day to a cousin, Judge Ewing, about the success that Stevenson had made as a campaigner in the West, how cleverly he adapted himself to every situation, Ewing told me this story:

The Vice-President and Judge Ewing had started out from Illinois on a car attached to the rear end of a train, and when they reached Missouri Mr. Stevenson came to the back platform, met the multitude, and said; "My friends, since coming into Missouri and looking into your most intelligent faces and seeing the prosperity that you enjoy, I have determined that if I ever change my place of residence I shall adopt yours."

Ewing continued: "We went over into Kansas, and there the Vice-President said: 'Since coming into Kansas and looking at your fields of waving grain and the happiness that is depicted in your faces, I have said to myself, "If I ever change my place of residence I will adopt yours" '; and he came into Colorado, and it was the same story there; and then into New Mexico, and at last to Yuma, Arizona; and in Yuma there was nothing to be seen in the landscape except cactus and sand, and there was nobody to meet us but a group of Indians, and all they wore was a blanket thrown over their shoulders, as they huddled in the shade of the depot, and it was 130 degrees in the shade. I thought that the old man would fail there, but he came right to the front, looked down at these Indians with their blankets, and said: 'My friends, since coming to Yuma, and looking upon you, I have decided that if I ever change my style of dress I will adopt yours.' "

And yet that spot—Yuma, the hot, and Yuma, the home of the desert Indians—is a very successful, prosperous business center, surrounded by land that grows oranges and lemons and, to my taste, the best grapefruit grown in the United States.

THE APACHE INDIAN AS A CITIZEN

Up above there we have the Salt River project, known because of the Roosevelt Dam; and that dam was largely built by the Apache Indians. The best Indian (and there are lots of them in all this country of which I am talking) is the Indian that fought us the hardest. He had gimp, he had stuff, he had the conception of himself which did not permit him to be conquered, even by the white

man; but when he had to yield to the inevitable he turned to work, and work has become his salvation.

There is no better illustration in the world of the fact that work is our salvation than the Indian. Where he has abundance of money, where he is cared for as in an orphan asylum, where he is paternalized, where he is treated, as many would have him treated, as a baby in arms, he does not grow, he does not flourish, he does not become a man. But where he is made, like the New England fathers, to struggle for his own living, and finds that he cannot live unless he is forced to struggle, he comes through and makes a man of himself.

THE CHANGE THAT HAS COME OVER IDAHO

Now we start at the northern boundary again, at Idaho. There is a State which a few years ago was thought to be an almost worthless piece of land, good for forests and with a few minerals. I was on a piece of land along the Snake River, in Idaho, two years ago which raised 575 bushels of potatoes to the acre.

We have there the highest dam in the world, the Arrow Rock Dam, built by our own people. The government is now projecting an enterprise to water, perhaps, several hundred thousand acres of Idaho land. The undertaking will involve the moving of a city, the town of American Falls, taking that town up on wheels and carrying it a mile or two back, so that we can flood the land where it now stands.

Seven years ago I visited the Minidoka project, in that State, and found the people discontented. Today they are, I suppose, among the happiest farmers and the most contented people in our country. Here I saw a town where there never had been a fire lighted, houses with fireplaces and with chimneys, and some houses without fireplaces and without chimneys. No fires were necessary because at the dam above the town the water had been stored to irrigate the land, and at the dam electric power was generated for use as heat, light, and for cooking. The women churned with electricity and the sewing-machines were run with electricity. I suppose they had a sort of paddling machine for the naughty children that they ran by electricity. It was an electric city.

THE ELECTRIC AGE ON THE FARM

And that is not an impossibility in any section of our country. One of the things that women can do (and women do love a precise and definite job) is to try to make the life of the woman on the farm more happy. There is no one group of people deserving more sympathy, more of support, more positive aid, than the woman who lives on the isolated farm; and for her electricity, if it can be brought to her house, is invaluable.

For the woman farmer in Maryland, Virginia, and Pennsylvania electricity is just as necessary and just as possible. Why can't we take our coal at the mouth of the mine or down in the mine, turn it into electricity, and send that power by wire over every farm of the country? We do it where we have water power, and you can generate electricity with natural gas and with coal.

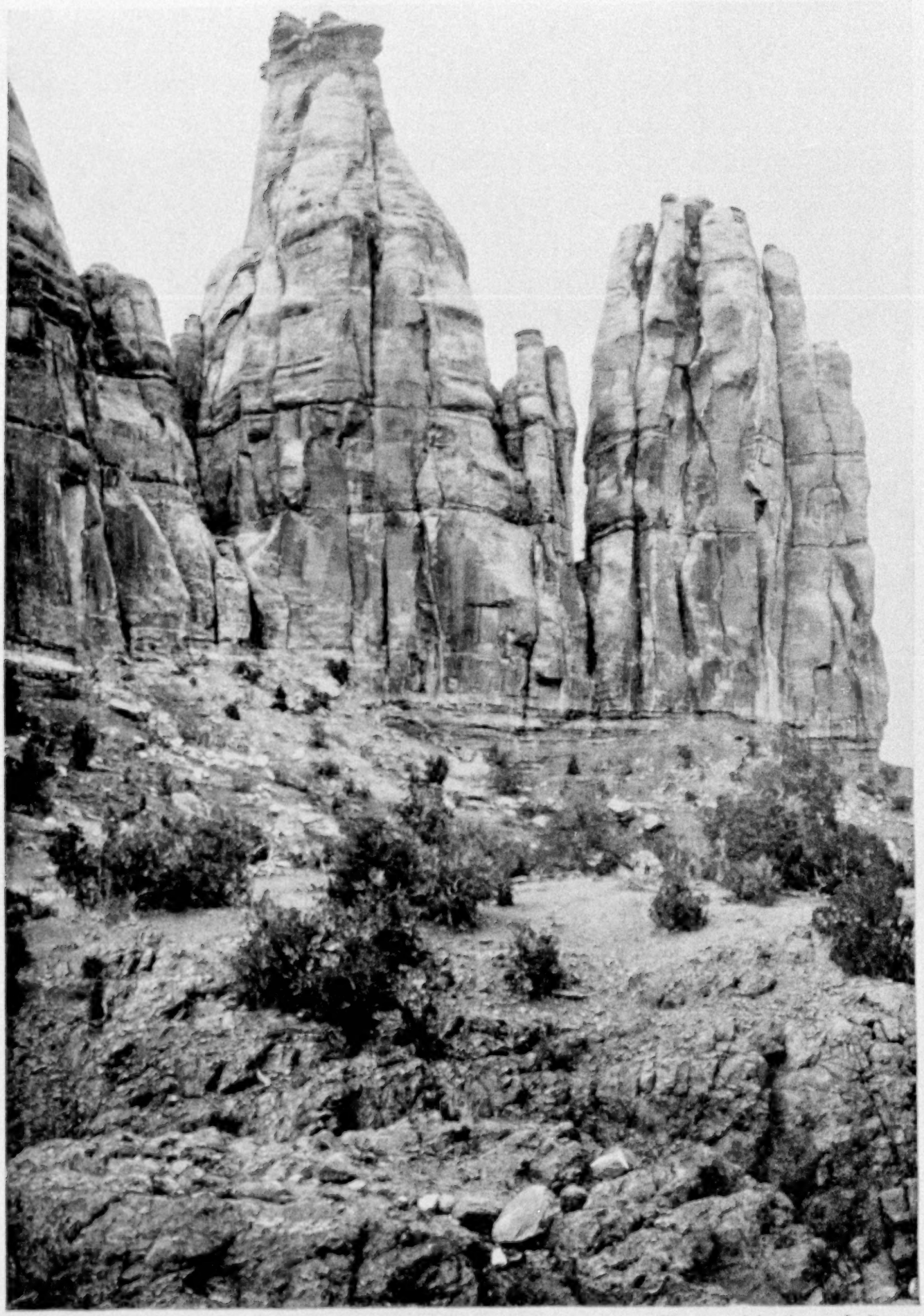
We are a wasteful people, for we do not know the possibilities in our resources; but some time the engineering mind will get to work upon such practical problems as this, and then life will become less complex and the woman on the farm will have more time to herself to think of the things that she ought to have some chance to think of.

Idaho is a rich State and is growing rapidly. It has a bed of phosphates, practically inexhaustible, to fertilize that whole Western country; and it has forests, mines, a fine State university, and an excellent school system.

WHAT THE MORMONS HAVE DONE FOR UTAH

Crossing the border you come down into Utah.

Never speak disrespectfully of the Mormon Church. It has as law-abiding, steady, hard-working, kindly a group of people in Utah as will be found anywhere this round globe over. Brigham Young may not have been a prophet of Almighty God, but he worked a miracle when he crossed from the Missouri River over that desert, leading his band of a few hundred followers with their push-carts, going out into that unknown waste,



Photograph by George L. Beam

COLORADO NATIONAL MONUMENT: WESTERN COLORADO

"The Court group" is one of many highly colored, fantastic formations in this reservation. As a standard for comparison, note the minute figure of the man who is standing halfway between the camera and the rock, shown at right of center.

A ZIGZAG MOUNTAIN ROAD NEAR DENVER, COLORADO

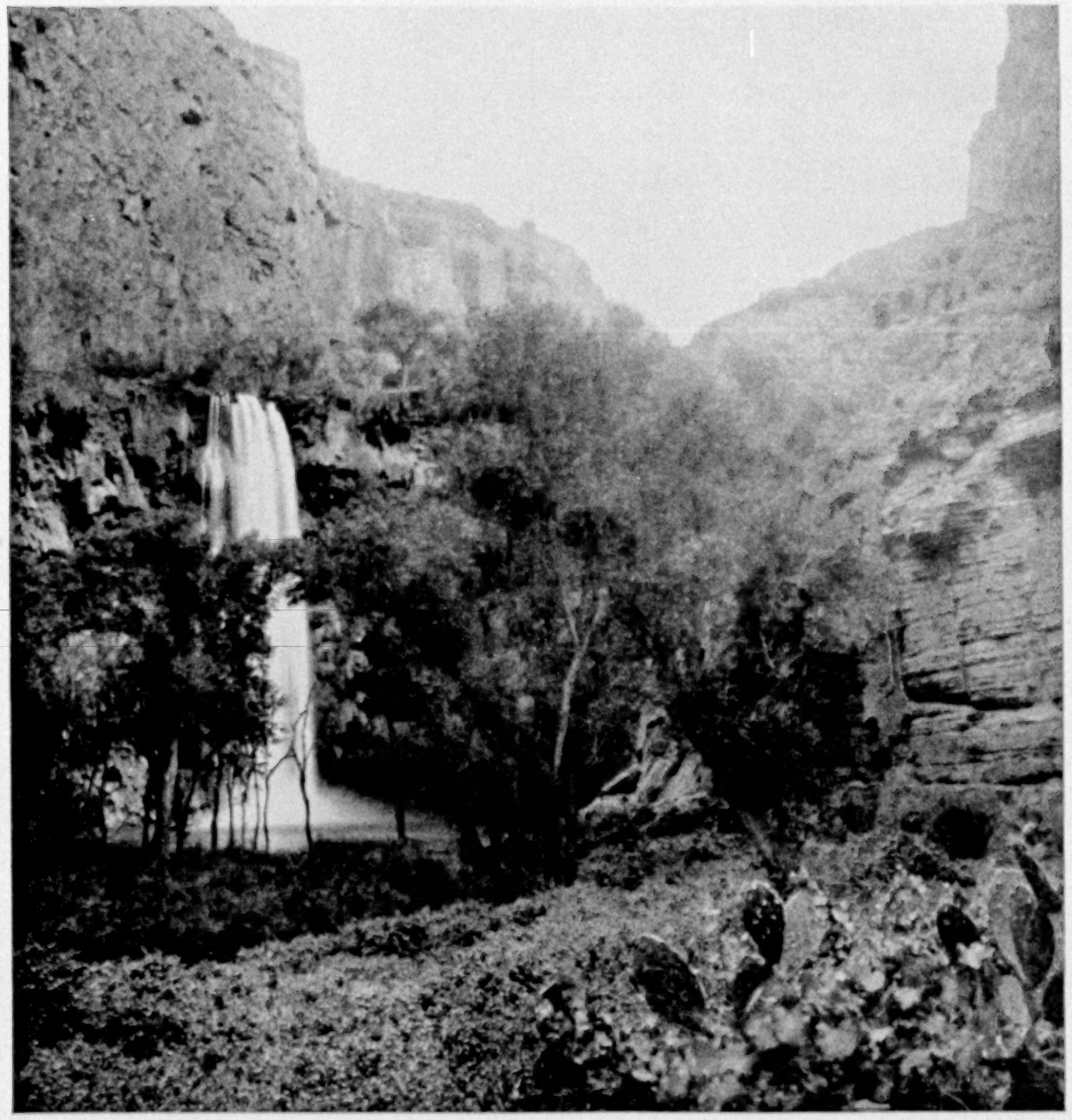
and turned the land that lies around Salt Lake City into a garden.

I brought from Egypt several years ago the greatest irrigation expert in the world, perhaps, the man who built the Assuan Dam upon the Nile—Sir William Willcocks, the man who claims to have discovered where the Garden of Eden was located, at the junction of the Tigris and Euphrates rivers—and I sent him to look over the irrigation enterprises of the United States, and he said: "Nowhere else have I seen people who understand so wisely how to apply water to land as around Salt Lake City."

Utah has wonderful beauty in it as well as great stretches of desert that are to be reclaimed. We have just discovered a new beauty spot there, Bryce Canyon.

A PROSPECT FOR THE FUTURE

When the King of Belgium was here I gave him a picture of a new beauty spot in the United States that we had found within a canyon. Just think of a land in which after 100 years or more of occupation men can go out and discover a great canyon filled with wonderful stalagmites, great pillars of rock which rise up hundreds of feet from the bottom of the



Photograph by Kolb Brothers

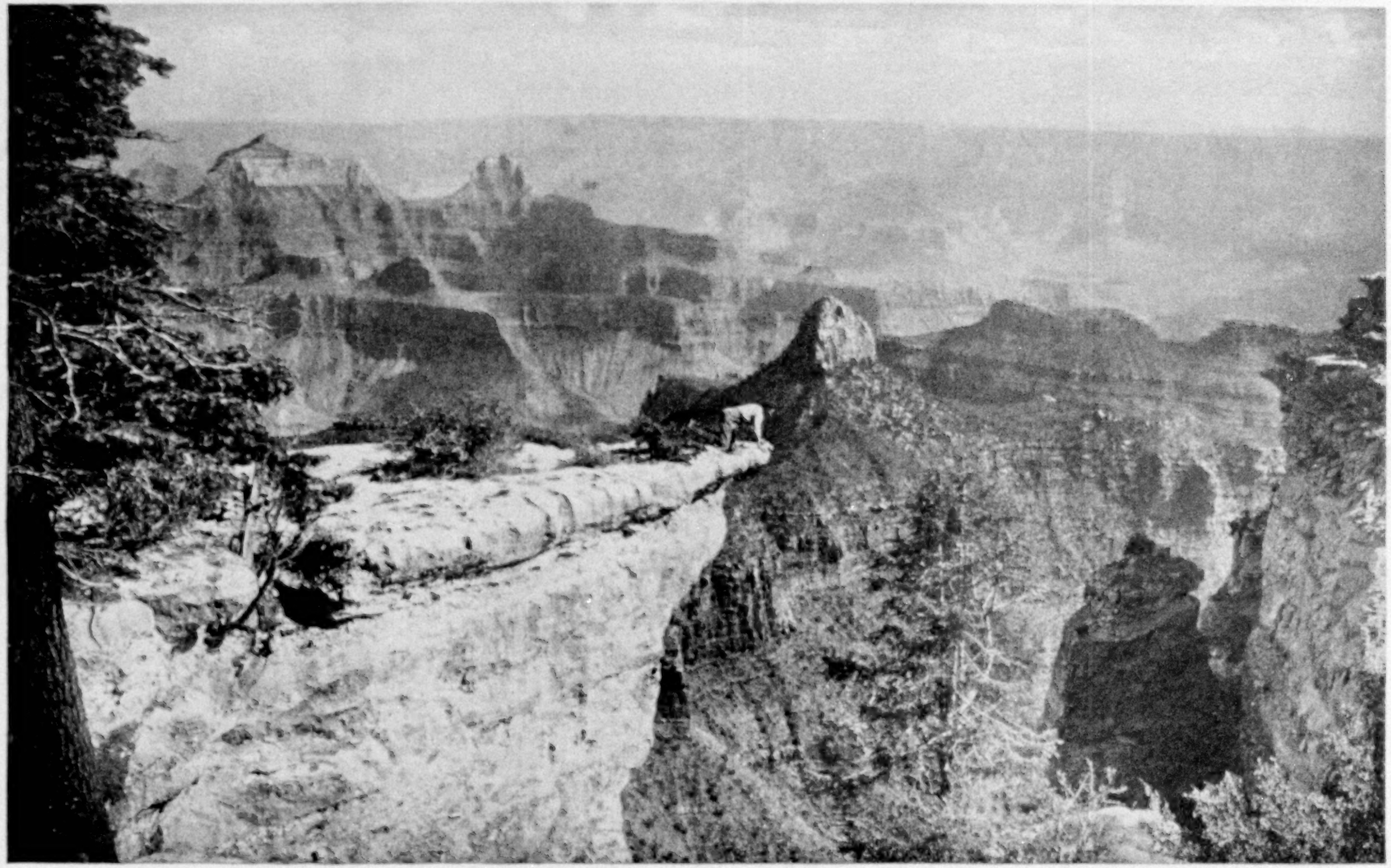
MOONEY FALLS, A CATARACT WHOSE NAME PERPETUATES THE MEMORY OF A DARING MINER, WHO LOST HIS LIFE WHILE BEING LOWERED TO THE BOTTOM OF THE PRECIPICE, 180 FEET

The Indians have given the name of Havasu to this canyon, and they call themselves the Havasupai—the People of the Blue Water. The Havasu is one of the most beautiful of the lateral canyons of the Grand Canyon of the Colorado.

canyon in colors like those of pastel. I hope we shall soon turn this into another of our national parks.

Just below this spot is the Colorado River, where we already have the Grand Canyon National Park. And some day some one will put a stick of dynamite into the bank of the Colorado River and blow it out and throw a dam across and store those waters, and then we shall have power enough to run the railroads of that section and power enough to lift the waters of that river up on to the mesa lands and turn that desert into orchard.

Those are the things that fill your mind when you are in that Western country: A mountain in Utah being cut down at the rate of 50,000 tons a day, and every ton of it yielding copper; going out in the



Photograph by Kolb Brothers

GRAND CANYON, LOOKING SOUTH FROM THE KAIBAB PLATEAU, WITH THE ZOROASTER AND BRAHMIN TEMPLES ON THE LEFT

Pantheism ought to be natural in Grand Canyon, for not only has Nature furnished the most awe-inspiring panorama that the titanic forces of geography have ever unrolled for the eye of man, but a score of edifices carved by the patient hand of Time suggest the religious temples of various races reaching from the plateau of Iran to the valley of the Ganges.

desert in southern Utah and sticking down a probe into the earth and striking oil flowing at the rate of a thousand barrels a day!

And better things than oil or fruit or copper come from those Western lands. Take that land over in Oregon, to which I have referred. In that valley was raised a boy who walked from the Willamette Valley down to Stanford University that he might have an education as a mining engineer—Mr. Herbert Hoover. Those are the great, great things that we are producing. There is hardly a State that is not known by some one individual's name; and there are some of them that are already known by the names of a dozen men who have given distinction to the States from which they come.

THE NOBLEST VIEW IN AMERICA

Now let us go up north again, into Montana. You are at Glacier Park. I have not seen all of the grand places of the world; but if I were to be asked what one thing in nature had most impressed me I would not say the Canyon of the Yellowstone, beautiful and rich in color as it is, or the Grand Canyon of the Colorado, overwhelming in majesty and inspiring as it is; but I would say that when you stand at the edge of Saint Mary's Lake and look across and up to the two mountains—one named by the Indians "Going to the Sun" and the other "Almost a Dog"—you would find probably the one thing on the North American Continent that would inspire you most and make you feel most properly humble.

Glacier Park, with glaciers and lakes, alongside of the Blackfeet Indians, and down south of them the Sun River irrigation project.

Six years ago I was petitioned by a great body of people on that project to release them from their obligation to take water. I went out to see them. We held a mass meeting of all the people on the project, and all begged that they might be allowed to continue their life as farmers by the dry-farming method. They said there was no danger of drouth coming; that they were doing splendidly, and that they did not wish to be obligated to pay $60 or $70 an acre for water rights.

I protested, I urged, I begged them to look further ahead; I held out to them the prospect of sure crops, larger crops; but my voice was not listened to.

The only person on my side was a girl, a girl, I suppose, 19 or 20 years of age, who had been a school teacher in the East. She saw what that country could be with irrigation and what it would be without irrigation. She made a capital speech, but she did not succeed; so I said, "We will abandon this project because you wish it."

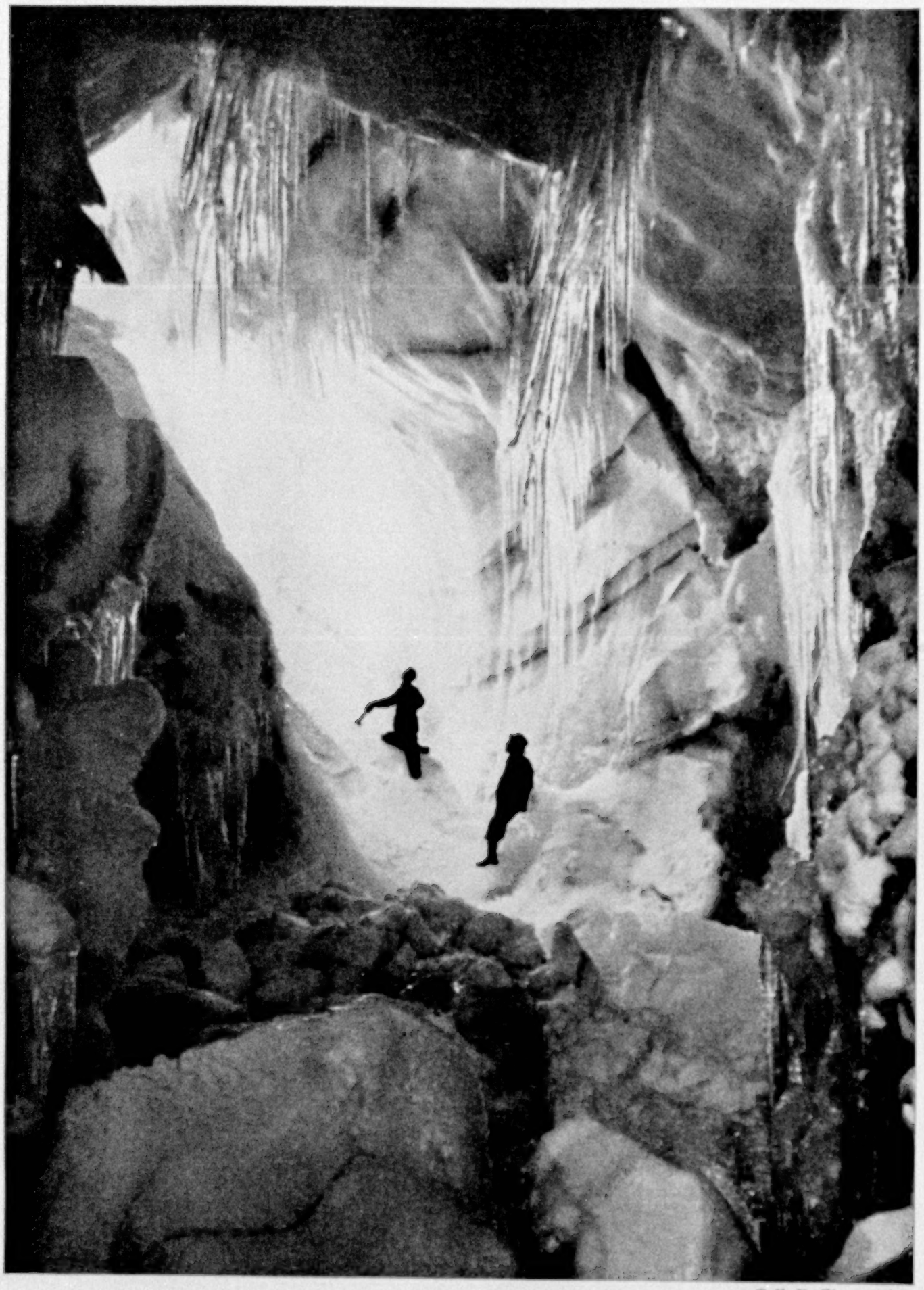
A few weeks before I relinquished the duties of Secretary of the Interior I received a petition, signed by every man that was left on that project, asking that we again take it up and develop irrigation upon it, thus testifying that the girl was the one true prophet of the whole group.

Come down out of Montana, with its beauties and its Indians and mines, into Wyoming—irrigation there, Indians there, mines there, oil there—and into Colorado. In Colorado we have a park where you can stand at one spot and see twelve mountains, each one 12,000 feet high. I want to see that park extended along the east side of the Rocky Mountains, so that it will include everything from the Rocky Mountain Park down to Pike's Peak. Already one hundred and fifty thousand people visit this section with their automobiles every year—car licenses from New York and Maine, from Manila and Honolulu.

HE TREATED HIS TREES LIKE CHILDREN

In Colorado, too, we have irrigation projects. I was on one of these projects some years ago, and I met a man who had gone there to combat tuberculosis. He had left Illinois, where he had been a railroad man. He had a little money, bought about five acres of land, and put it into peaches. He told me that the year before he had made $2,500 off those five acres of peaches.

I asked him the secret of his success, and he said, "Because I love every tree. Each morning when I get up I go out among the trees and treat them as if they were my children. I look at them, I pat them; I look at the soil; I look up at the leaves to see if any leaf has turned yellow, and if there is I discover the cause of it. I love each of those trees, and the



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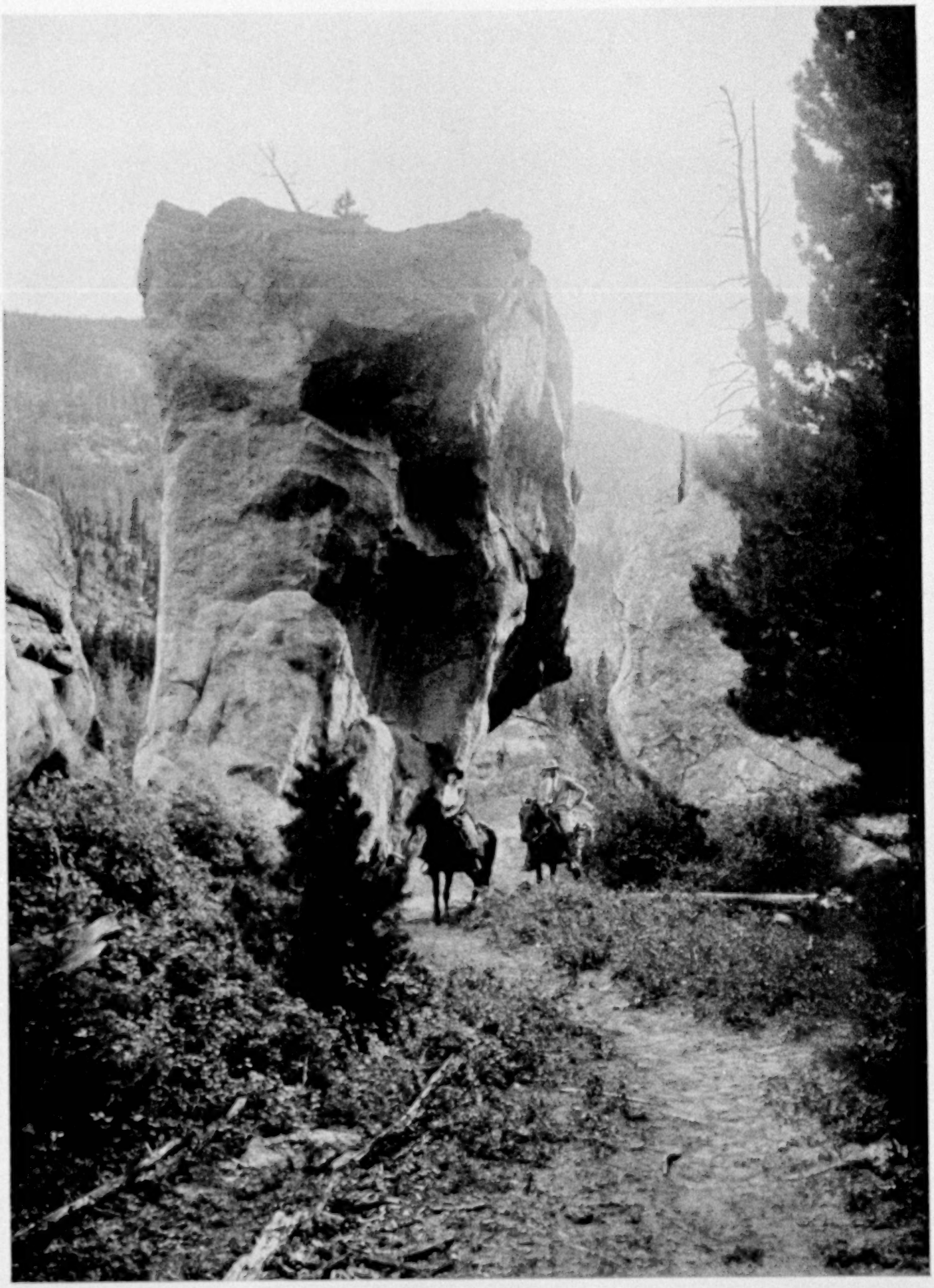
INTERIOR OF HALLETT GLACIER, ROCKY MOUNTAIN NATIONAL PARK: COLORADO

Not only is Rocky Mountain Park famous for its beautiful glaciers—Hallett, Tyndall, Andrews, and Sprague's—but more especially for its glacial records of millenniums past. Here in truth "the mountains, rock-ribbed and ancient as the sun," reveal to the eye of inquisitive man the story of the world in its making.



BALANCED ROCK ON THE TRAIL TO FERN AND ODESSA LAKES: COLORADO

Everywhere in the great West one encounters the unexpected. Many are the balanced rocks weighing hundreds of tons, yet so delicately poised that it would seem a mere gust of wind could unbalance them. But neither storm nor stress, through countless centuries, has been able to shake them from their apparently insecure foundations.

Photograph from National Park Service

SLAIN DEER ON A STATION PLATFORM NEAR YELLOWSTONE NATIONAL PARK

A national park is a modern counterpart for the ancient city of refuge, and within its boundaries game is safe from the hunter; but the heavy snows sometimes cause famine, and the wild animals leave the park in search of food only to be shot down by those who are waiting for them beyond the limits of the preserve.

result is that they give something back to me and I am an independent man."

There is a secret in that too. It has its application pretty much through life.

AN ANSWER TO STRANGE PHILOSOPHIES

Colorado, one-third of it forest; and yet when the King of the Belgians was here the other month there was a dinner given to him in one of our fine houses, and he was served upon gold plates that were literally dug out of the soil of the State by a man who was a miner, the husband of the woman in whose house this dinner was given.

If all Europe knew that a man by will and skill and hard work could dig into the soil of the United States and bring out the gold, bring out that which makes men rich, there would not be much feeling there that any of these strange philosophies that are being preached would make great progress in America.

I could go on and on and take each individual State and show how intimately it touches the Department of Interior. Take Illinois. You would not suppose that there was much in Illinois that might interest this Department, which is primarily a department of development. But outside of Chicago there is an exquisite place, called "The Dunes," down by the lakeside—a lovely place made by the shifting sands—that some day we ought to have for a park.

A PLEA FOR THE COUNTRY SCHOOL

Just outside of Chicago, also, there is a model country school. Do you know that we do not give the children in the country districts a fair chance? I wanted several years ago to get Congress to appropriate $300,000 that I might get a representative teacher from each district in the United States to spend a month at that school in Illinois, where they could find out how country children should be taught, how each boy and each girl in the school could be made to articulate with father and mother on the farm. I could not get the money. But some day we will dignify the country school and still more dignify the country school teacher.

Talk about being underpaid and not being able to live, not being treated with respect and having no dignity given to you! No one has as justifiable a com-

A FOREST GHOST ON FLATTOP MOUNTAIN, ROCKY MOUNTAIN NATIONAL PARK: COLORADO

Wind, snow, and flying particles of rock have reduced this old spruce tree to a skeleton of its former self.

plaint as the school teacher of the United States. In that one State two or three years ago the ordinary farm laborer was paid more than the school teacher.

WHAT DO WE DO FOR THE TEACHER?

If your Americanism is founded upon intelligence (and it must be if it is going to live), you must have somebody who can bring out of the young what is in them. It is not a question of pouring; it is a question of drawing. You cannot expect that from a girl who gets $40 a month. Moreover, you have got to treat people with respect and with dignity if you are going to get the best out of them.

What recognition do we give to the teacher? What social status does she have? We talk of Americanism, and there is the person who is at the very heart and center of Americanism. Upon her depends our future. She can be made the greatest instrumentality for building up the right spirit within the boy and girl in America—the greatest of all instrumentalities for Americanization.

NEW YORK CITY CHILDREN LEARNING TO SWIM IN ONE OF THE CRIBS PROVIDED IN PALISADES INTERSTATE PARK

While possessing no national park within its confines, the State of New York has in the Palisades Reservation one of the most picturesque playgrounds and natural retreats on the continent. We need many more such parks in our Eastern States.

I had rather have the school teacher than to have all the newspapers and moving pictures and organizations and congresses and all else combined, because she can sow the seed in ground that is fallow. And what status do we give to her? With what dignity do we treat her? What deference do we pay to her? Socially, where is she?

If you love this country, if you believe that you are a good American, see that the teacher gets an adequate salary, see that she gets proper recognition! For all of life is not money. The intangible things are the things for which most people fight and that are of most value. And there is no better illustration of that than the city of Washington, to which people are drawn largely because of those intangible things, not the least of which is our vanity, our love of distinction.

OUR INDIAN SCHOOLS

I sometimes think that our Indian schools in places are better than some of our schools nearer home. We teach the Indian boy to raise four kinds of grain upon a plot of ground, to shoe a horse, to build a shack, and he comes out of that school not only knowing a little reading, writing, and arithmetic, but knowing how to make his living. He is not called away and told to fight for himself without any tools, without a sword in his hand.

We have Indian schools in which we teach the girls how to care for themselves and others. We have little cottages. We put two girls in a cottage. Those girls each month must produce a hat and a dress and do all their own cooking; and they must cultivate a garden patch and learn how to care for a sick baby and a sick woman.

In Oklahoma we have a group of Indians who are the richest people in all this world, with an income of $20,000 a year per family. They are not the very best Indians that we have. I don't like to say that; but it is true, because they have too much money and they don't have to work.

But down here in North Carolina we have a group of Cherokees for whom nothing has ever been done, and I hope nothing will ever be done for them. There has not been an illegitimate birth for forty years in that reservation. It has fine upstanding, self-respecting, well educated farmers and herders.

Way down in Florida are the Seminoles, who fought us 100 years ago. Today they raise cattle and are contented. I was offered a million acres of land by the State of Florida if I would drain it, and I wanted it badly, because I wanted it for the soldier boys. I had the thought that when this war was over we could make great use of those lands. And we could, if we had acted in time and had a bit of foresight; if there was not so much politics in this world, and it did not take so many men so much time to realize what ought to be done.

THE CHALLENGE TO WOMAN

We are not going to be happy cluttered together in houses banked up against each other in cities. That is not the normal, natural life for us. We are not to have cities made of apartments and boarding-houses and hotels and produce the good, husky Americanism that has fought our wars and made this country and developed those lands that I have been talking about. The thing that is big within us is the creative instinct, and the challenge that is up to woman is to stimulate and develop that in man.

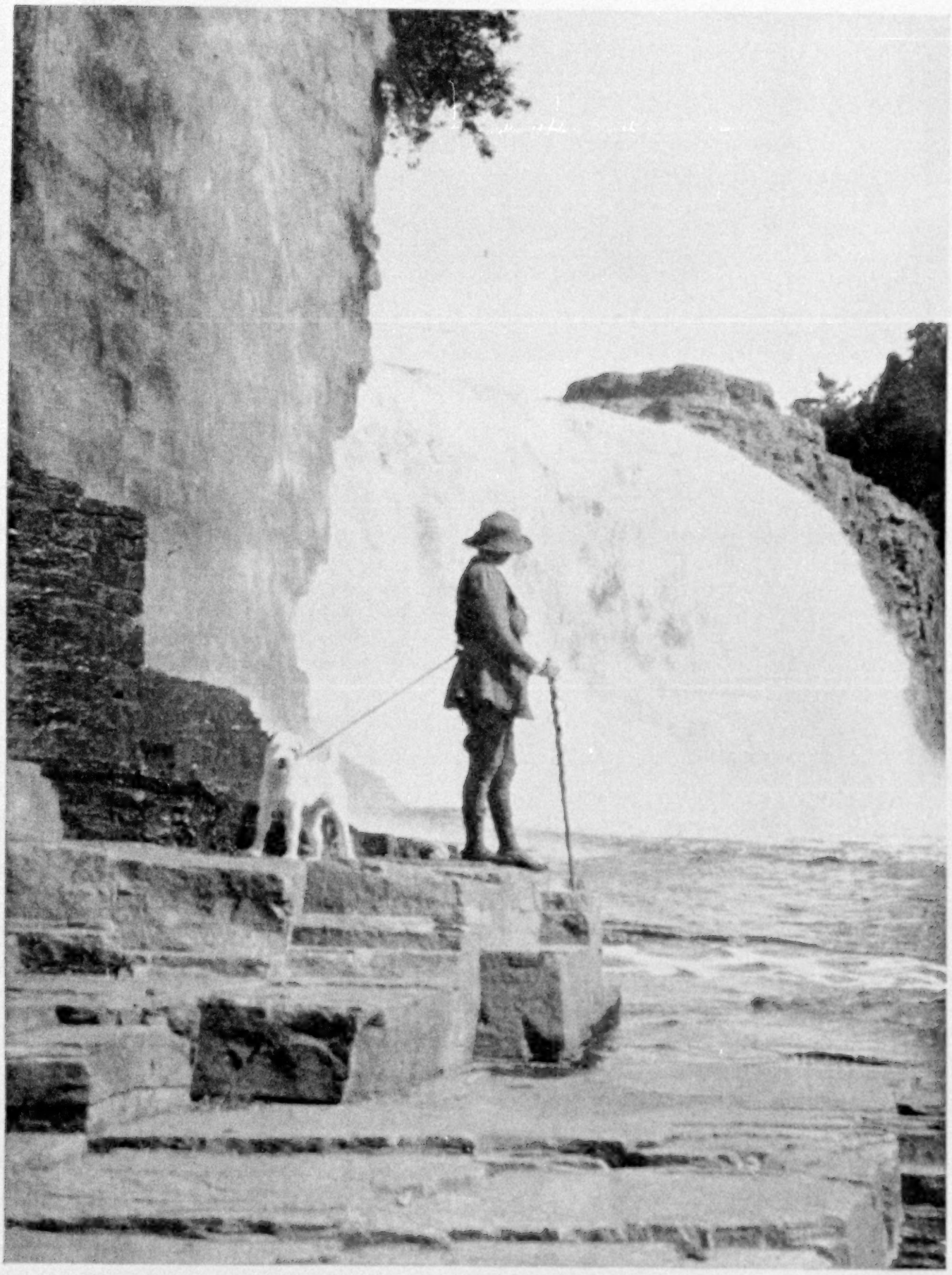
Every man feels the desire to get down into the soil and wrestle with it and make it yield to him. It is a part of the instinct that God implanted at the time when He ousted man from the luxury of the Garden of Eden; and he has been marching round the globe making that conquest ever since.

Now, because of the lure of pleasure, because of the moving-picture shows, and because of the desire to get close together, man is deserting the farm. When I was born, 70 per cent of our people lived in the country; now not more than 50.

THE PLAN FOR THE BOYS FROM THE OTHER SIDE

If that movement goes on, we are not going to have the America that we have had—that has been vibrant, fibrous, strong, self-dependent, resourceful.

So I wanted those boys when they came back from the other side to have a



Photograph from Famous Players-Lasky Corporation

A SCENE IN THE PROPOSED VICTORY PARK, ADIRONDACK MOUNTAINS: NEW YORK

Only two of the national parks antedate our Centennial and only three others are thirty years old. The national park is the democratic equivalent for the vast estates of the nobility of Europe; yet no noble has such playgrounds. The first parks were centered around more or less inaccessible natural wonders, but a movement is on foot to provide the thickly populated parts of America with playgrounds which, while lacking some of the phenomenal features of Yellowstone or Yosemite, still will meet with the universal demand for lovely scenes and places of wholesome outdoor recreation.

A CAMPING PARTY IN PALISADES INTERSTATE PARK: NEW YORK AND NEW JERSEY

There is no joy limit to the ride along the Palisades of the Hudson River and the speed of a smile a mile is here being largely exceeded. This beautiful playground comprises many thousands of acres along the west bank of the Hudson, in the States of New York and New Jersey, including what is known as Harriman Park, in Rockland County.

piece of land allotted to each of them, where they could live in communities to which they could bring their brides—land that would have a little cottage on it and be fenced and broken, so that the boy could go upon it at once and make his living; borrow a few hundred dollars from the government and put stock on the land; having a modern house and a community center around which this colony would gather.

I wanted one of those communities in every State, so that all might see what an ideal farm life should be, for I thought that the gospel would spread.

We could have had this. There is abundant vacant land, land that can be had for almost nothing. Between the National Capital and the Gulf of Mexico there are 32,000,000 acres of unused lands. We could support the entire United States, if need be, on that body of land.

I wanted these boys to be given that

chance; but it would have cost some money. That is the hard thing to get, especially if it involves vision. But we must come to it; we must come to it if we are going to have the kind of men in the future that we have had in the past.

We must keep the boy in love with the soil. He must feel as the French peasant felt who was fighting because that soil that he loved was his. There is something in the old story of Achilles. You reach down and touch the soil and you get strength from it; you do not get it from asphalt streets. One hundred and fifty thousand boys have written asking that they might have a chance at such a farm, and we cannot give it to them.

POWER! POWER! POWER!

Power! Power! We must have more power! I want all our streams that have possibilities for power, from the James all up to the Saint Lawrence River, connected, the power developed in them, and then a great channel, a stream of power, circulated through those States. It can be done; it will be done some day.

I make the appeal to women that they fire the men with the ambition to make this country what it can be. We have done gloriously, but we must not stand still. The way to stand off Bolshevism is not to talk about it; it is to do things which show that in this nation there is hope; that we have possibilities; that this land is the best of all lands.

Why? Because it is filled with a people who have imagination and willingness to work. We must stimulate those imaginations and keep at work. We can stand off ideas of any kind, because we can meet them with the one solid argument that Lincoln was so fond of; he always spoke of the argument of facts.

These things that I have enumerated are in America. And if a man has his best chance here, then that man will be proud of the traditions and the institutions and the character of the people that have made this country. That is true Americanism.

TO KNOW AMERICA IS TO LOVE IT

Then, too, we must show to the people around us that the principles that have guided our fathers, the love of liberty and the love of right and the sense of mercy and kindliness, are things that a nation may express occasionally, but that every one of us must express constantly.

You cannot take the man from the Balkans and the woman from Norway and interpret America to them in strict terms of abstract law, or in terms of mountains of copper, or of miles of railroads. You must interpret America to them in terms of American life—the beauty of American life, its dignity, the generosity of our natures, our willingness to be fair, our desire to help, our knightlike qualities.

To know America is to love it. For it is a thing of life; it is growing, struggling, climbing, stumbling. It is thinking through its problems, groping through them, living through them. Out of its wealth in things of the earth and its greater wealth in things of the spirit it is making a new society, different from any that is or that has been.

We do not see what is going on. We see but a phase, the tiniest segment of a great circle.

Under liberty and order men are stimulated to their best, challenged to create. The inhibitions of long-settled static societies are lifted and the possible man is having his day.

MEN DREAMING DREAMS

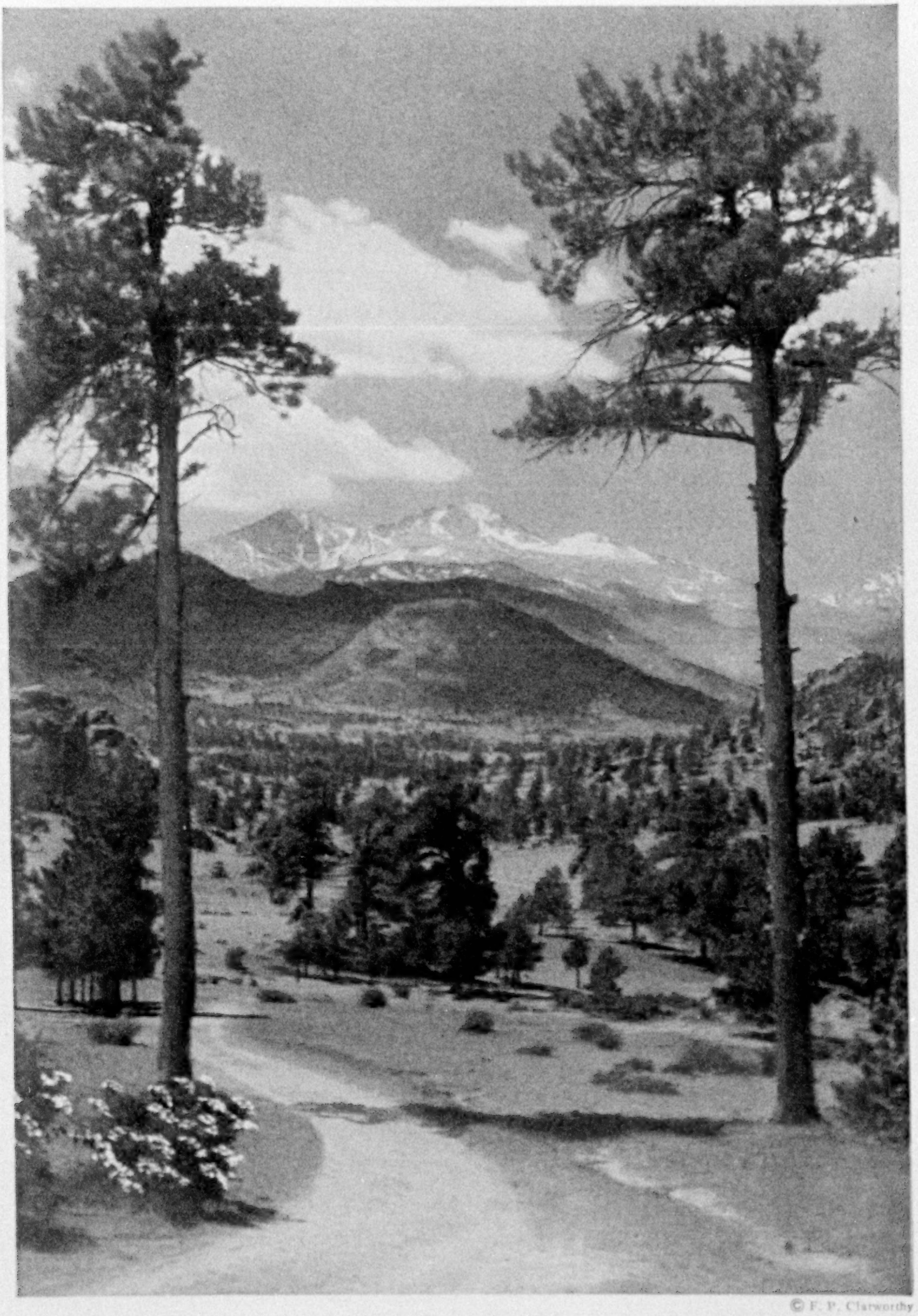
So everywhere throughout this land, away off in those remoter sections which I have mentioned, as well as nearer by, men are dreaming dreams. Some write those dreams on paper, and some write them on the mountain side in orchards, or within the mountains in mining shafts, or in the tall buildings of the cities, or in safe docks for ships.

Everywhere this new people in this new land is doing something that is a service. Boys in the sage-brush colleges are writing poems, men are planning books or novel mechanical devices. Girls are preparing themselves for the study of the sciences. Painters and sculptors and chemists are proving themselves.

They have the world to draw on; all its richness is theirs by inheritance—the color and warmth of the Mediterranean peoples and the sterner, colder, more steadfast stuff of the North.

This is to be a new picture in the world gallery.

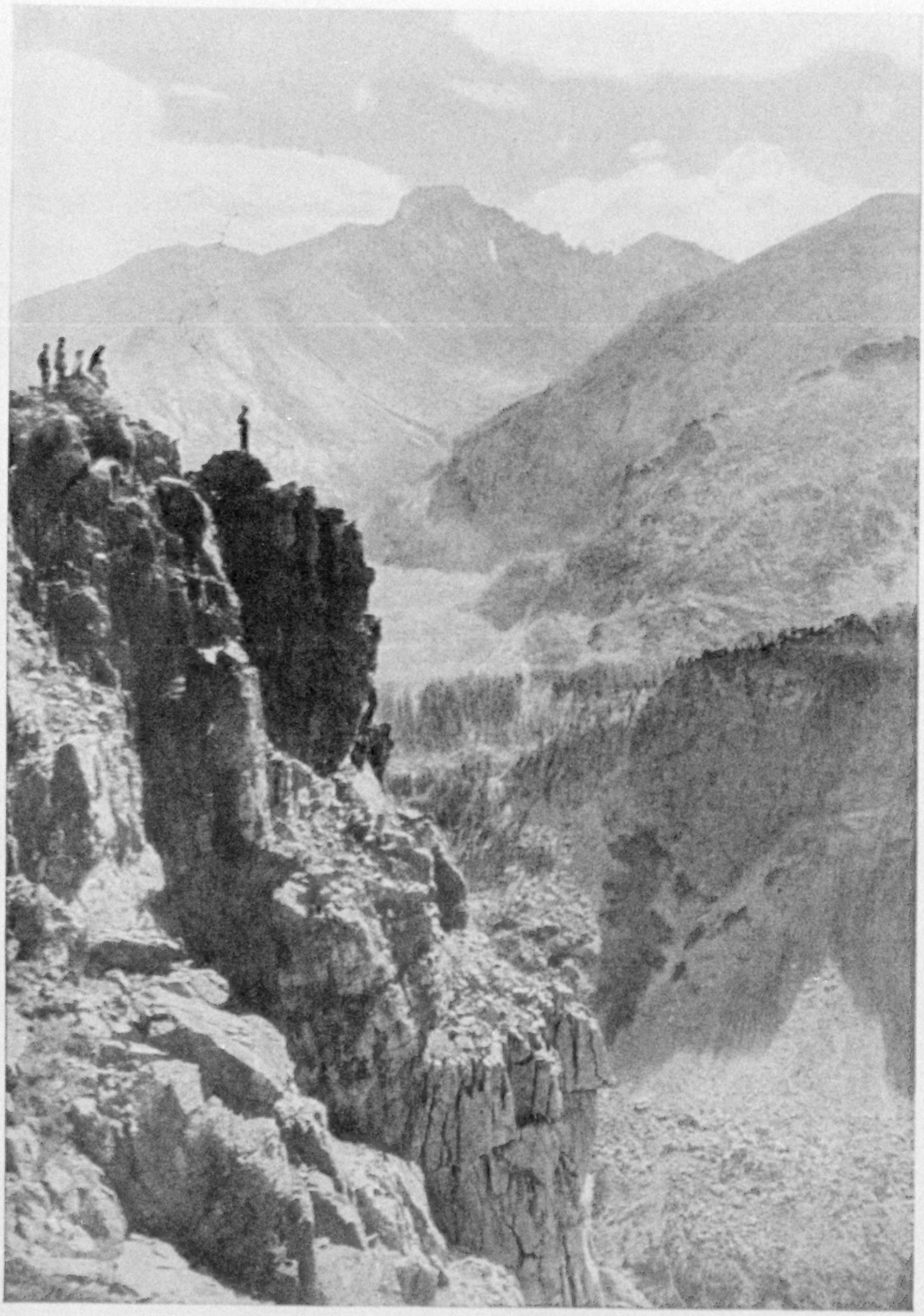
XUM



© F. P. Clarworthy

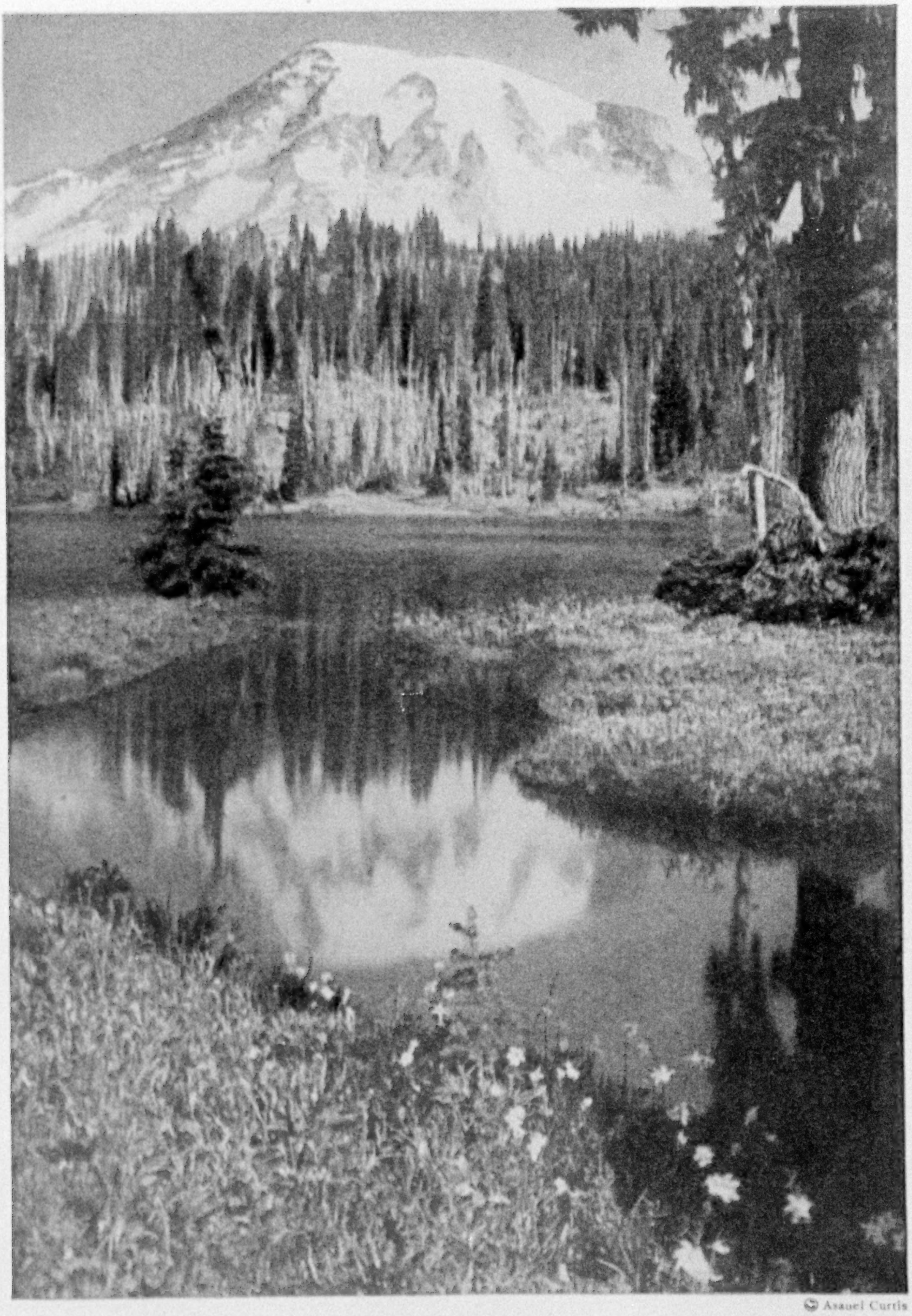
THE ROOF OF THE CONTINENT IN ROCKY MOUNTAIN NATIONAL PARK

Astride the Continental Divide, Rocky Mountain National Park not only contains a noble company of great peaks rising from flower-clad valleys, but through the variety and legibility of its glacial records, it forms the people's Rosetta Stone of glacial geology and reveals to the nature student intelligible evidence concerning the remote past.



THE SQUARE CROWNED HEAD OF LONG'S PEAK FROM THE FROST-CARVED FLANK OF FLATTOP

Beloved monarch of all he surveys, this king of Colorado summits rises almost in the center of the four hundred square miles of mountain grandeur constituting Rocky Mountain National Park. Here glaciers whose irresistible power is combined with a laggard advance are building up moraines and illustrating to contemporary man the forces that shaped our continent in the past.



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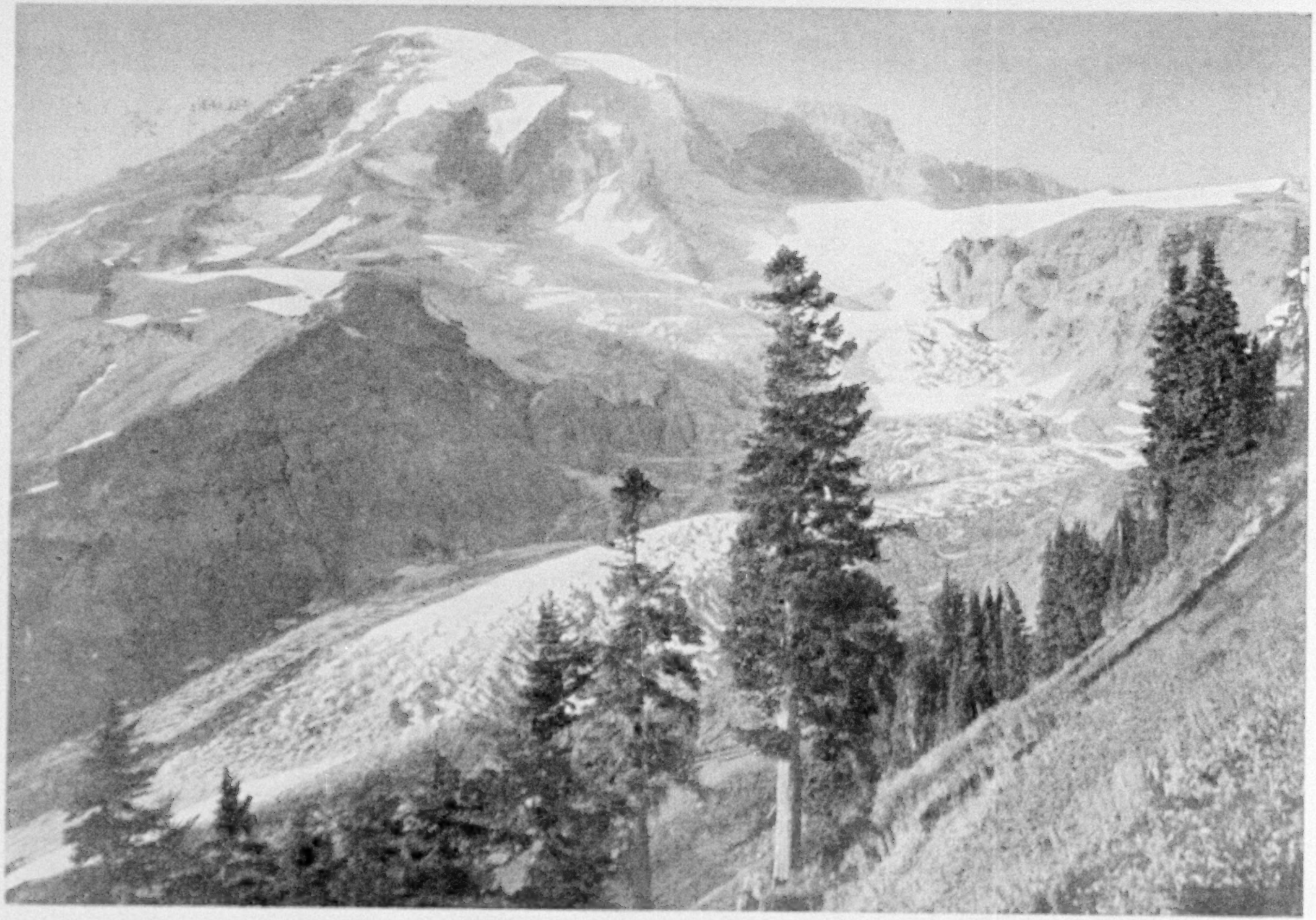
"THE MOUNTAIN THAT WAS GOD": MOUNT RAINIER

This mountain of Indian mythology constitutes the Kohinoor of Mount Rainier National Park, fifty-seven miles from Tacoma. With an unconscious insight into the service rendered by mountain peaks, the red men of the Northwest called this great snow-peak the "Fountain-breast of Milk-white Waters."



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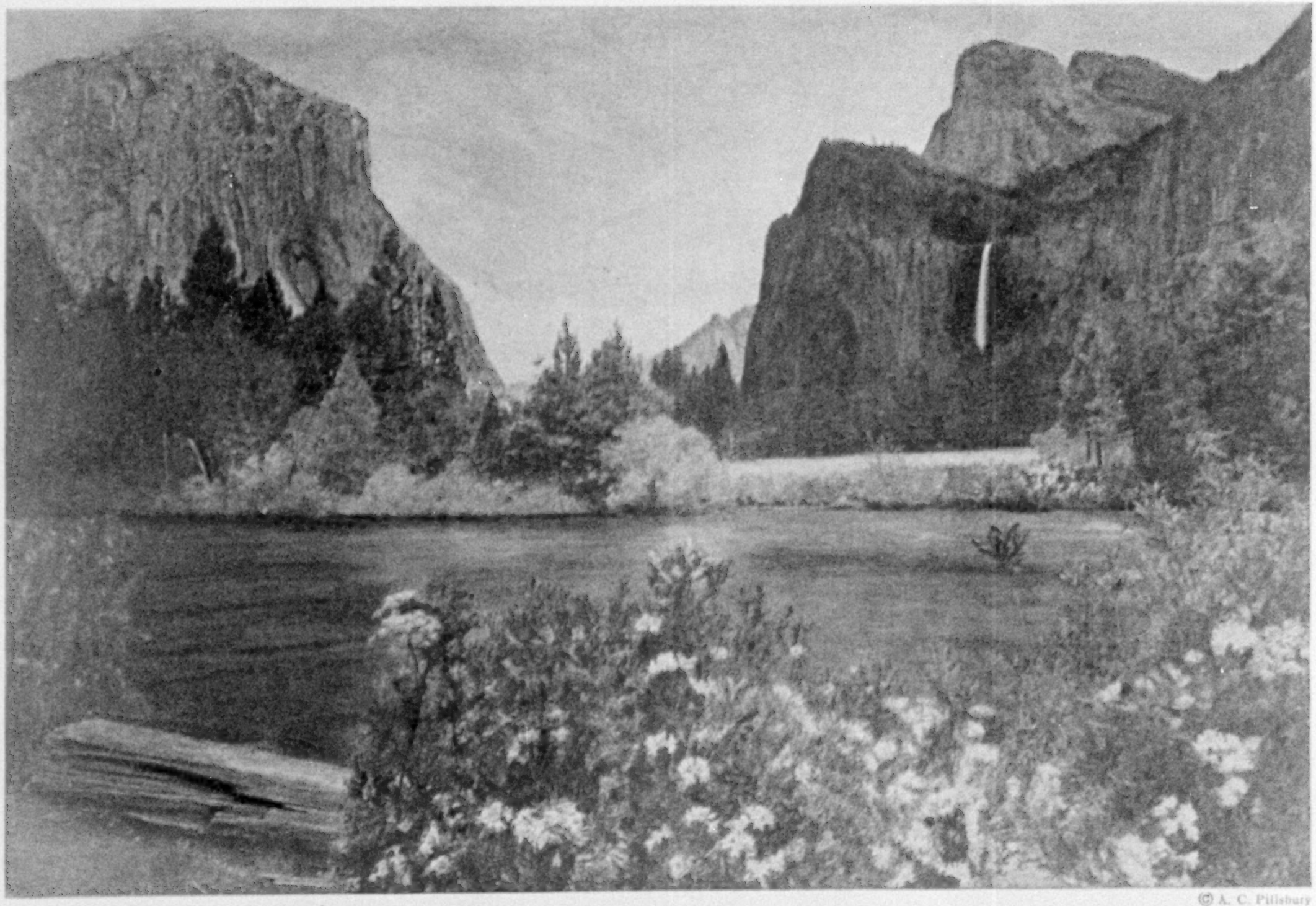
MOUNT RAINIER, THE MAJESTIC

Once a lofty beacon, lighted by the volcanic fires, the violent respiration of the mountain titan added height to his stature and breadth to his shoulders. Mount Rainier has now donned an ice mantle, miles in length, through which his rugged frame obtrudes. Twenty-eight glaciers form "His Majesty's" ermine cloak.



© A. C. Pillsbury

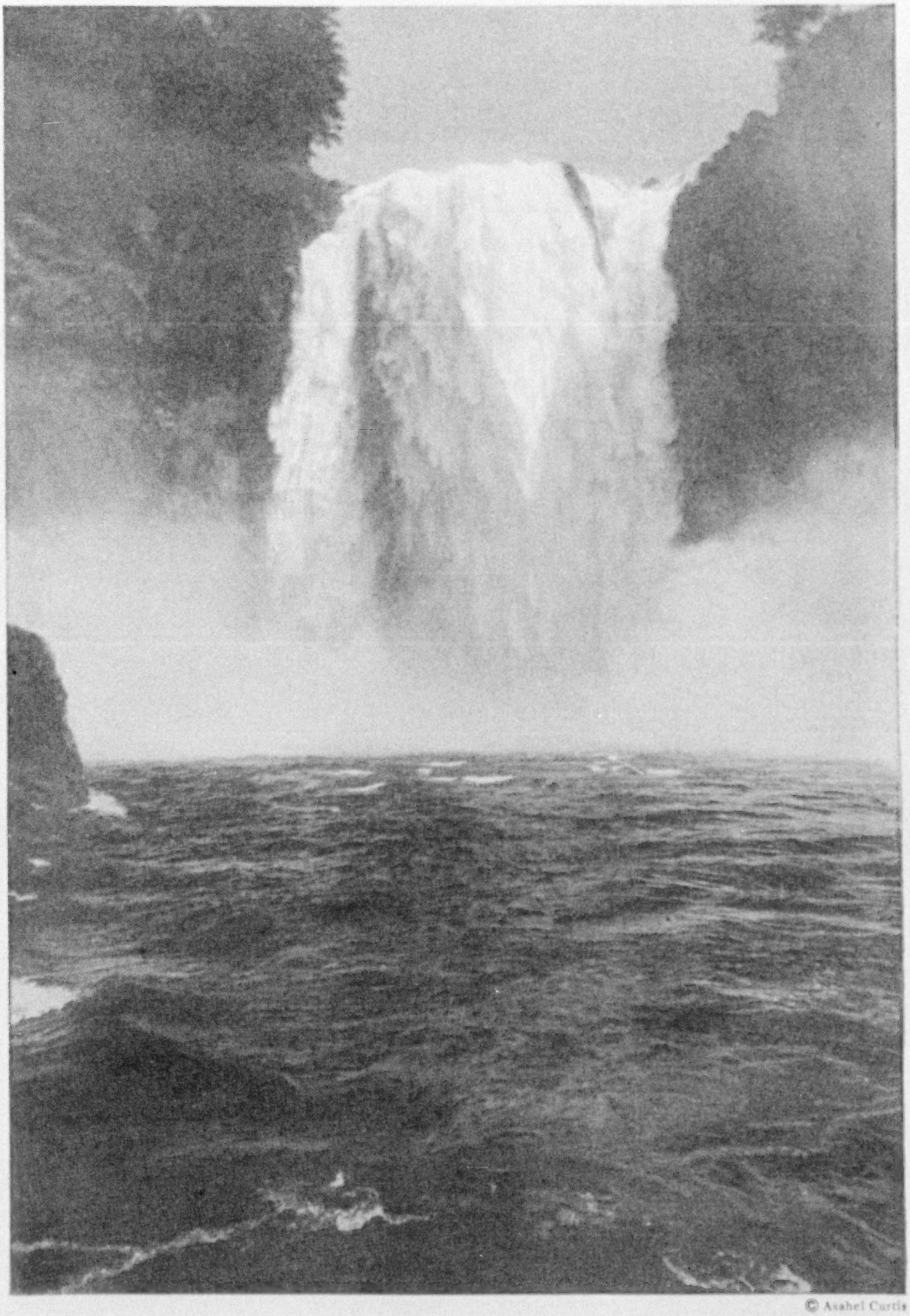
THE ROCK PORTALS OF YOSEMITE VALLEY

On the left rises the sheer precipice of El Capitan, more than two-thirds of a mile in height, whose grandeur seems more impressive from the upper side. Across the valley, Cathedral Rocks cut the blue above the spot where the wind-blown lace of Bridalveil Falls is draped from plateau to valley in snowy purity, enhanced by spray clouds of iridescent beauty.

© Fred H. Kiser

THE GLORIOUS GRAVE OF A FALLEN MONARCH: CRATER LAKE NATIONAL PARK

Kings of nature, like their human counterparts, sometimes pass away in a spectacular fashion. Mount Katmai blew off its head, but its mighty mass still dominates the view. Mount Mazama, wasted away by internal disorders, collapsed into the seething mass above which it once raised its proud head. There was a reaction and the internal forces tried to raise another monarch. But the coup failed and tiny Wizard Island, almost drowned in blue spring water of surprising clearness, stands as the impotent heir of a blustering sire.



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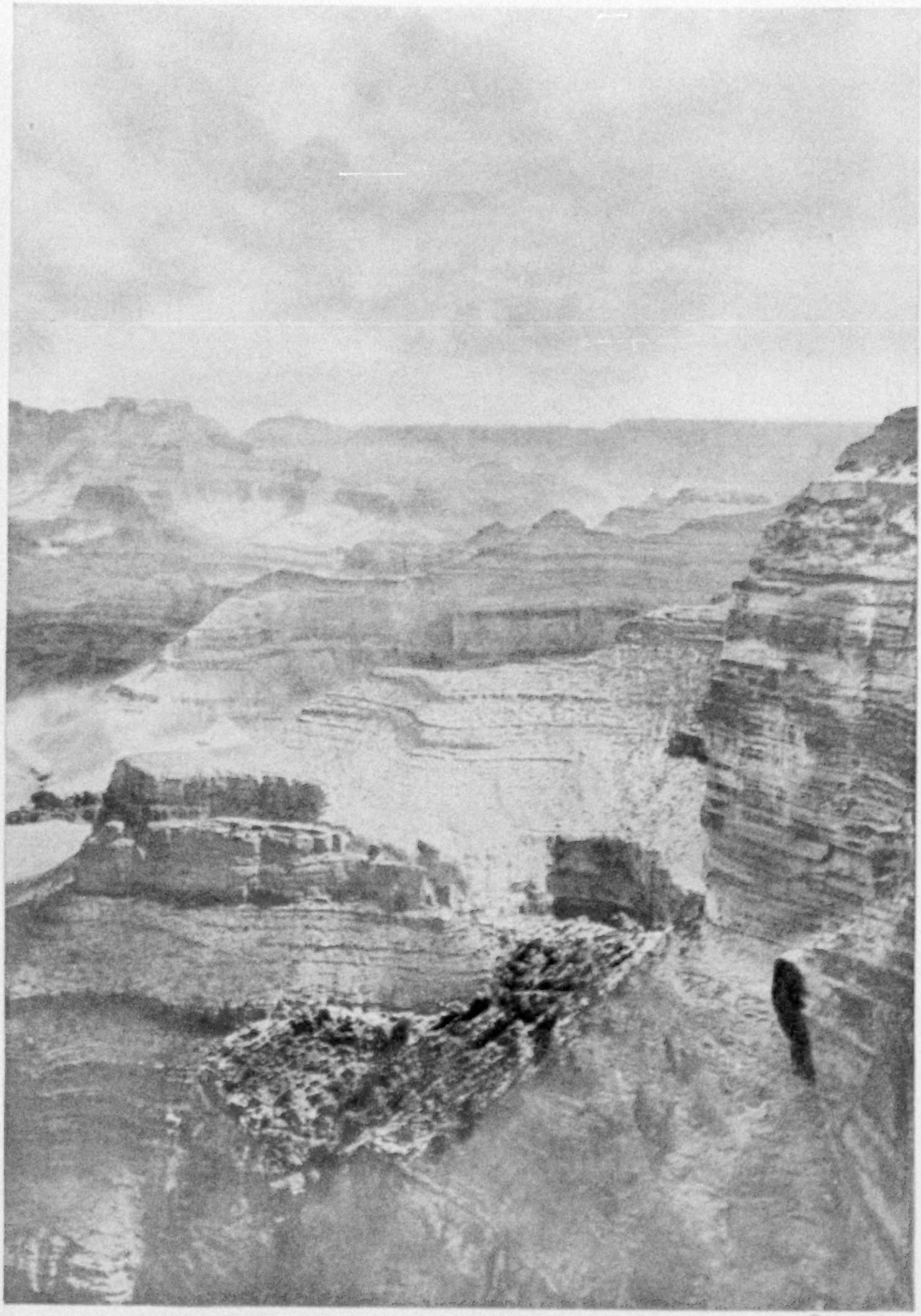
THE NIAGARA OF THE NORTHWEST

Not far from Seattle, Washington, Snoqualmie Falls, more than half again as high as Niagara, furnish the rapidly growing city with immense power. Beauty and modernity co-operate rather than compete along the Pacific Coast and the cities have unsurpassed mountain panoramas.



© Kolb Brothers

THE CYCLOPEAN CANYON OF THE COLORADO: LOOKING EAST FROM HOPI POINT

Tinted with the camouflage coloring of the Supreme Artist, "The Battleship" occupies the lower foreground. Beyond rise the heights that have been named the "Vishnu Temple" and "Wotan's Throne." High above them, on the precipice to the right, the ceremonial fires flare forth upon the memorial altar erected in honor of Major J. W. Powell, who first traversed the Grand Canyon by water.

SAVING THE REDWOODS

By Madison Grant

Mr. Grant's recital of the inroads which are being made upon some of the oldest and most magnificent forests of the nation will be read with keen interest by every member of the National Geographic Society, which was largely responsible for rescuing the finest group of Big Trees (Sequoia gigantea, or Washingtoniana) of the Sequoia National Park from the fate which now threatens the Redwoods of northern California. The members of the National Geographic Society will recall that at a time when, through a failure of Congress to appropriate a sum sufficient to prevent the Big Trees of the Giant Forest from falling into the hands of private lumber interests, the Society supplemented Congress' appropriation by a subscription of $20,000 in order that these age-old monarchs might be preserved in perpetuity (see "Our Big Trees Saved" in The Geographic *for January, 1917).*

THE eastern tourist visiting California feels that he has explored the State when he has crossed the Sierra and the central valley, with perhaps a side trip to Lake Tahoe and to the Yosemite Canyon, with its Mariposa grove of big trees, and has completed a leisurely trip down the southern coast.

After a journey of this character, which is all that is accomplished by nine out of ten visitors, he carries away an impression of a golden brown, semiarid countryside, waterless stream beds, endless fruit orchards, entire absence of turf and grass, abundant flowers, a rainless sky, and a pitiless sunlight.

There is, however, another and different California on the coast from San Francisco north to the Oregon line. This region is heavily wooded, with running streams and abundant moisture, fogs taking the place of rainfall during the summer months.

Much of the immediate coast is an old Pleistocene strand, elevated about 1,000 feet above the sea and cut through at various points by rivers and streams. The new boulevard runs along this elevated beach-line for many miles, and when completed will be one of the finest motor highways in the world.

With high mountains to the east, the traveler looks out over the vast expanse of the Pacific toward the setting sun.

It is along this northwestern coast that the great redwoods of California are found, and it is here that the photographs accompanying this article were taken.

The impending destruction of these forests is the most serious question confronting California in the effort for the preservation of some portion of her vast inheritance. It has been stated officially that all of the old stand of forests in the United States will be cut off within the next sixty years, but this period will be materially shortened by the new methods of logging.

Before describing these groves, it may be well to say a few words about the genus *Sequoia*, as there is much confusion regarding the big trees of the Sierra and the redwoods of the coast.

SEQUOIAS WERE FLOURISHING WHEN DINOSAURS ROAMED THE EARTH

The genus *Sequoia*, to which the two surviving species of the great trees of California belong, stands widely separated from other living trees. Together with closely related groups, it once spread over the entire Northern Hemisphere, and fossil remains of Sequoia and kindred genera have been found in Europe, Spitzbergen, Siberia, Alaska, Canada, and Greenland.

Changes in climate and other causes have led to their gradual extinction, until the sole survivors of the genus are confined to California—one to high altitudes in the Sierra Mountains and the other to the western slope of the Coast Range.

Fossil leaves and cones of genera closely related to Sequoia occur in the rocks of the Jurassic and of the Trias, and the members of the genus Sequoia were common and characteristic trees in California throughout the Cretaceous.

To give some idea of what this bald statement means, these trees, virtually

Photograph from Charles Willis Ward

LOOKING UP THE GREAT KLAMATH RIVER FROM THE GREAT DIVIDE AT THE WATER GAP: CALIFORNIA

The trees shown in this illustration represent more than one billion feet of lumber—an irresistible temptation to commerce if title to the forest is not obtained by the National Government as a reservation in perpetuity for all the people of America.

in their present form, flourished in California before the mammals developed from their humble, insectivorous ancestors in the Mesozoic, and while the dinosaurs* were the most advanced form of land animals.

The mountains upon which these trees now stand contain fossil records of early Sequoia-like trees, proving that this group abounded before the rocks that constitute the present Sierra and Coast Ranges were laid down in shallow seas, to be upheaved later and eroded into their present shapes. In the base of Mount Shasta and under its lava flows, the ancient rocks are marked with imprints of their leaves and cones. Such antiquity is to be measured not by hundreds of thousands, but by millions of years.

THE BIG TREES OCCUR IN ISOLATED GROVES

While the duration of the family, of the genus and even the existing species, or species so closely allied as to be almost indistinguishable, extends through such an immense portion of the earth's history, the life of the living trees is correspondingly great.

The Sequoia is not only the oldest living thing on earth, but it is the tallest tree in the Western Hemisphere, and we have no reason, so far as our paleobotanical studies have gone, to believe that there ever existed on earth either individual trees or forests that surpassed in size, in girth, in height, or in grandeur the Sequoias of California. And these are the trees that are being cut for grape stakes, for railroad ties, and for shingles.

While the purpose of this article is to deal with the redwoods of the coast rather than the big trees of the Sierra, both of the genus *Sequoia*, a description of the redwood should be preceded by a few words on the big tree.

The big trees, *Sequoia gigantea*, are found on the western slope of the Sierra Nevadas, in California, at an altitude of from five to eight thousand feet above the sea, with a north and south range of about 250 miles. They do not constitute a solid stand, but occur in more or less isolated groves, and growing with them are other huge trees, chiefly white fir, incense cedar, sugar and yellow pine.

These groves are about thirty-two in number and are much scattered and isolated in the northern part of their range, while in the south they are larger and closer together. This distribution shows that the big tree is on the decline, the various groves having long since lost touch with each other, while in the north the reproduction is very poor. They all grow in spots sheltered by surrounding forests, and the slopes of the Sierra are more or less windless, but now that the white man has taken the land they would soon be destroyed for their valuable lumber, unless artificially protected in national parks.

They have suffered throughout the ages from ground fires. Their extraordinarily thick bark, which is from one-half to two feet through, is a great protection, and although its heart has been burned out, a tree lives on so long as this bark and its underlying cambium layer can reach the earth.

If protected by human care, the big tree has remarkable recuperative power, and many specimens in the Giant Forest of the Sequoia National Park show an accelerated growth, owing to their immunity from fire even for a few decades.

These trees are from five to twenty-five feet in diameter at shoulder height above the ground, and in the Giant Forest alone there are said to be 5,000 trees of more than ten feet in diameter.

The height varies from 150 to much more than 225 feet, and as they are without taproots, they stand absolutely straight, often without branches from the ground to a height of 175 feet.

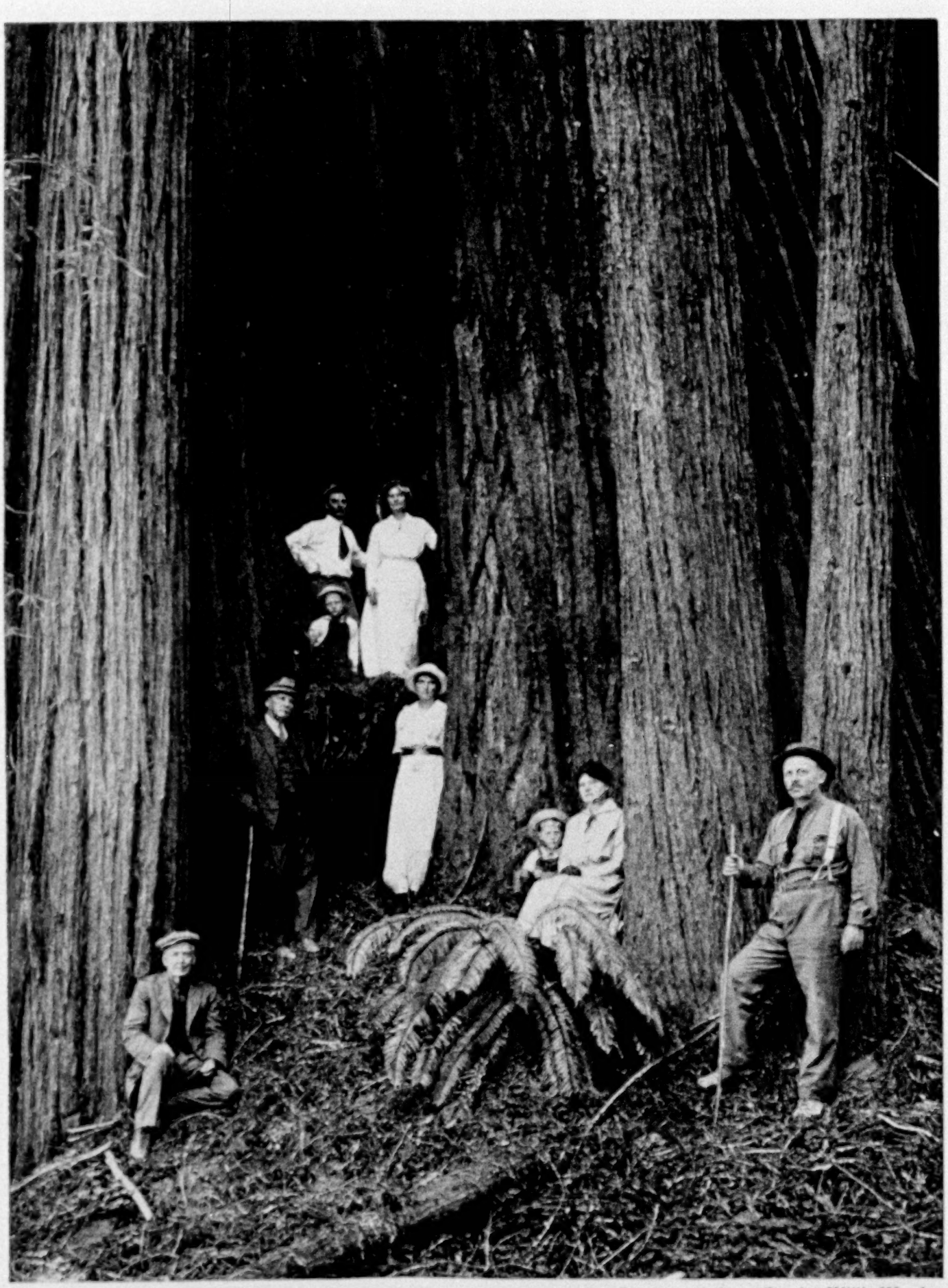
WHY THE TREES' CROWNS ARE DEAD

The crown usually is dead; not blasted by lightning, as has been often asserted, but because ancient fires have eaten in at the base, so that the flow of sap to the top has been checked.

When connection with the ground and the life-giving water supply has been strongly re-established, growth takes place from the topmost uninjured branches and forms a new, but false, crown.

It is estimated that if these trees had escaped upsetting by the wind, and had

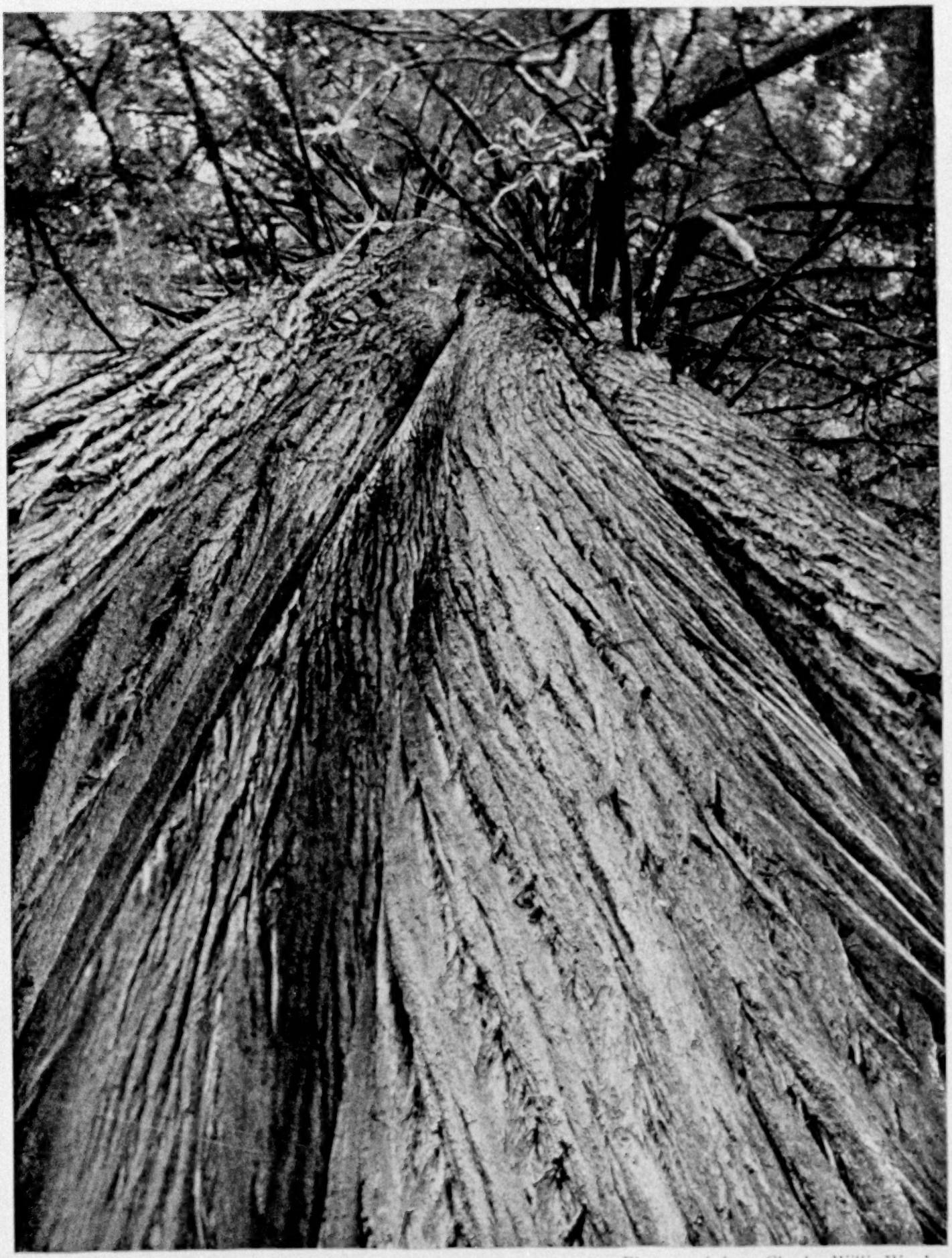
* See "Hunting Big Game of Other Days," by Barnum Brown, in the NATIONAL GEOGRAPHIC MAGAZINE for May, 1919.



Photograph from Charles Willis Ward

ONE CLUMP OF REDWOODS CONTAINING 250,000 FEET OF LUMBER; THIS GROUP OF TREES IS GRAFTED TOGETHER AT THE TOP (SEE ILLUSTRATION, PAGE 523)

The age of the redwood is about half that of the Sierra Big Tree, and the life of the mature specimens ranges from 500 to 1,300 years. Some of the Big Tree specimens when felled have been found to be more than 3,250 years old, and the General Sherman Tree undoubtedly exceeds these in antiquity.



Photograph from Charles Willis Ward

A SKYWARD VIEW OF THE CLUMP OF TREES, GRAFTED TOGETHER AT THE TOP, SHOWN IN THE ILLUSTRATION ON PRECEDING PAGE

The redwood has an unusually thick bark, but this serves as only partial protection from forest fires. In lumbering operations it sometimes happens that a loss of 30 per cent in timber results from the fires started to destroy the debris—brush, shattered branches, and fallen trunks.

Photograph from Charles Willis Ward

NO HEAVIER STANDS OF REDWOOD THAN SHOWN IN THIS ILLUSTRATION CAN BE FOUND IN THE REDWOOD BELT

The tree in the left foreground is 18 feet in diameter and contains 100,000 feet of merchantable lumber. These trees if preserved will soon produce more profit each year for the State than can be obtained temporarily by their destruction, and they will prove a source of increasing wealth to the State with each passing generation.

been allowed to grow entirely free from fire throughout their age-long existence, and had carried their proportionate growth (calculated from the tapering of the trunk) to their uttermost limits, they would be 600 feet high.

This is mere speculation, as is the theoretical age of some of the more ancient trees. The known age of trees which have been cut is from 1,100 to 3,250 years, but there is little doubt that this long period is much exceeded in such cases as the General Sherman tree or the Grizzly Giant. The life of these giants can be computed only by comparison with the measured trunks of lumbered trees, the actual age of which has been ascertained from the rings of growth.

There is always a factor of uncertainty in the size of trees, depending on their rate of growth and supply of water. In exposed positions, with poor water and soil, development may be greatly retarded, and a tree may be very ancient although relatively small in size. On the other hand, a favorable location, such as a pocket in the rock or access to underlying water, might greatly accelerate the growth of a tree within the same grove.

REDWOODS OF THE COAST

The redwood of the coast, *Sequoia sempervirens*—the immortal Sequoia—far from being a battered remnant, like its cousin of the Sierra, whose shattered ranks remind one of massive Roman ruins, is a beautiful, cheerful, and indomitable tree. Burned and hacked and butchered, it sprouts up again with a vitality truly amazing.

It is this marvelous capacity for new growth from trunk or from root saplings which is, perhaps, the most interesting character of the redwood in contrast with the big tree, which has no such means of regeneration and must depend on its cones for reproduction.

All the redwood forests have been more or less injured by fire, sometimes of ancient origin, but more often deliberately started by the lumbermen to clear away the slash, and it is a wonderful sight to see a charred trunk throw out a spray of new growth twenty or thirty feet above the ground, or a new tree standing on top of an ancient bole and sending its roots, like tentacles, down into the ground around the mother stump. Other trees stand athwart the fallen bodies of their parents and continually readjust their root systems to the decaying trunks beneath it.

The vitality of the second growth throws up a circular ring of new and beautiful redwoods around the parent stump, and these little trees come up again and again if cut. If, however, they are buried several times in succession, this capacity of shoot reproduction appears to be lost, and there are cases, notably about fifteen miles north of Arcata, in Humboldt County, where the highway passes through three or four miles of very large and thickly set burned stumps that show little or no signs of reforestation, proving that there are conditions where human greed and human carelessness make it impossible for even the redwood to survive.

REDWOODS ARE YOUNGSTERS FROM 500 TO 1,300 YEARS OLD

The age of the redwood is about half that of the Sierra big tree, and the life of a mature redwood runs from 500 to 1,300 years, in many cases probably more.

The diameter of the larger redwoods is sixteen feet and more and the height runs from 100 to 340 feet. Thus, while its diameter is less, its height is far greater than its cousin, the big tree, with the result and effect of a graceful beauty rather than impressive solidity. It is probable that trees will be found which will exceed this maximum altitude, and it is quite possible that an ultimate height of 350 feet may be recorded. One would anticipate the discovery of this tallest tree on earth either in Bull Creek Flat or along Redwood Creek.

Of course, in discussing the present redwoods, one must always bear in mind that many of the finest groves have fallen to the axe, judging from the silent records of gigantic stumps along the Eel River, especially at Sonoma Flat, only recently destroyed.

It is probable that the existing groves, with few exceptions, such as Bull Creek Flat, do not represent the finest groves of redwoods of fifty years ago. How needless all this sacrifice of Humboldt redwoods has been may be measured by

© Freeman Art Company

ONE OF THE MOST CONSPICUOUS FEATURES OF THE REDWOOD GROVES IS THE PROFUSION OF FERNS CARPETING THE GROUND BENEATH THE FOREST MONARCHS

Some thirty species of fern have been found in the forests of Del Norte and Humboldt counties, California.

the fact that few, if any, of the lumber companies have proved profitable investments, if their failure to pay dividends is a test of their commercial success.

THE REDWOOD RANGE IS 450 MILES LONG

The original range of the redwoods extended from Monterey north along the California coast to a point a few miles over the Oregon line, embracing an area with a length of about 450 miles and a width not exceeding 40 miles. The narrowness of this range seems to be determined by the fog which sweeps in from the Pacific, and the writer has seen the edge of the fog-bank clinging closely to the inland limit of the redwood belt.

Many natives believe that the redwoods attract fog, but of course it is the moisture of the fog deposited on the tops of the trees that determines their inland distribution. These forests are sometimes so wet that the dripping from the high crowns is like a thin rain, and at Redwood Creek in summer it is hard oftentimes to tell whether it is raining or not, so saturated with moisture are the foliage and the trunks when the fog darkens the forest.

In the southern and larger half of their range, the redwoods are somewhat broken up in more or less isolated groves, and the axe of the lumberman has now separated these groves still more widely. In the north there is an almost continuous series of solid stands of redwoods, constituting the most magnificent forests in the world, not even excepting the great Douglas firs and pines that adjoin them in Oregon.

The redwoods in the south seem to show a marked variation from those of the north, being generally redder in color, and their growth in rings or circles is much more frequent than in the groves of Humboldt and Del Norte counties.

THE VALUE OF A LIVING TREE FAR EXCEEDS THE VALUE OF ITS TIMBER

South of San Francisco the redwoods are now found chiefly in the Big Basin, which has been wisely made into a State park, and in the famous Santa Cruz grove. Intermediate spots along the Coast Range, notably at La Honda, are interesting chiefly as showing the pathetic solicitude with which the owners of surviving trees care for the battered remnants amid the charred stumps of former giants.

Here at least the owners have learned that *the value of a living tree at a public resort or along a highway far exceeds the value of its lumber*. All these southern groves are mere reminders of the forests that are gone, but the surviving trees will be carefully protected.

North of San Francisco the Muir Woods, on the slopes of Mount Tamalpais, are easily accessible and show something of the forest grandeur formerly found in the region of the Golden Gate. The preservation of this grove is entirely due to the wise munificence of Mr. William Kent, who presented it to the nation.

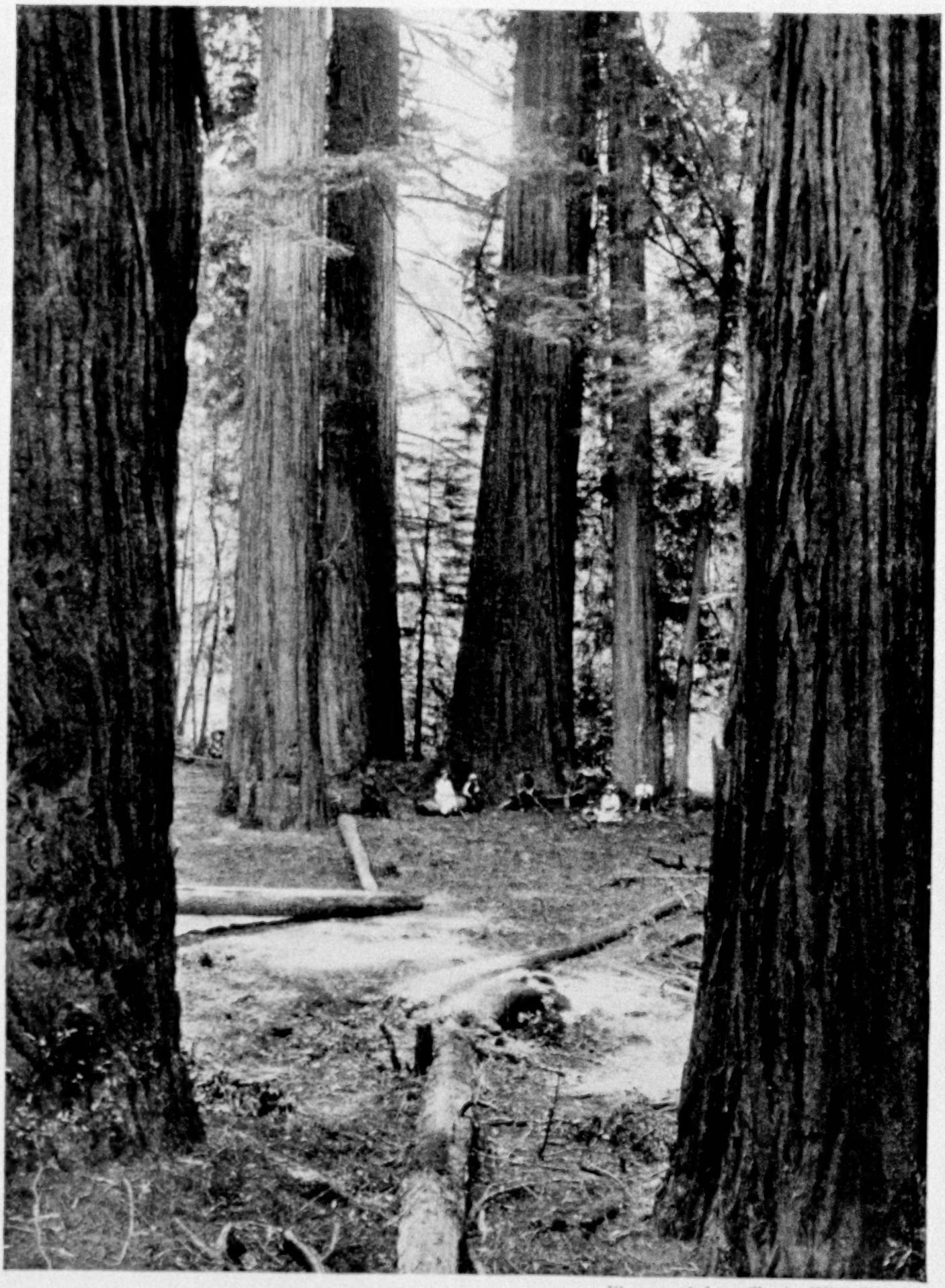
To the north, Sonoma County has purchased for public use the Armstrong Grove, and Mendocino County probably will be impelled to buy the Montgomery Grove. These last trees are situated near the highway to the north of Ukiah and will be the first grove visited by the northbound tourist. If they are purchased by the town or county, Ukiah will become the entrance to the Redwood Park series, and, like Merced, at the entrance to the Yosemite Valley, will derive a large revenue from motor tourists.

After leaving Mendocino County one enters the great groves of Humboldt and Del Norte counties. Here are solid stands of redwoods, and the observer finds it difficult to distinguish between one grove and the next.

Four great forests stand out prominently: They are (1st) the groves along the South Fork of the Eel River and the west bank of the main Eel, culminating in the Bull Creek Flat and the Dyerville Flat; (2d) the immense Redwood Creek grove; (3d) the Klamath River groves, and (4th) the Smith River groves at Mills Creek, in Del Norte County. Each has its peculiar beauty, and it is difficult to choose among them, but it is the trees of Humboldt County, along the South Fork of the Eel River, that at the present moment are most in peril.

ITS VIRTUES IMPERIL THE REDWOOD

The groves along the South Fork of the Eel River are traversed by the State highway, now in the process of construction. The building of this highway made the timber accessible, and the immediate



Photograph from Charles Willis Ward

A CAMPING SITE AMONG THE KLAMATH RIVER REDWOODS: CALIFORNIA

"The inhabitants of Del Norte and Humboldt counties have scarcely awakened to the possibilities of fabulous wealth in their redwoods as an attraction for visitors."

result was the establishment of small lumber camps that are destroying the trees along its edge. Not only are the trees along the road cut down, but the highway itself in many cases has been injured.

These great trees, with their hundreds of feet of clear timber, have, among other valuable qualities, the unfortunate characteristic of easy cleavage or splitting, and so they are in special demand for railroad ties, for shakes or shingles, and for grape stakes. These superb trees are sacrificed to supply the stakes to support vines because of the practically indestructible character of the wood, which will stand in the ground almost indefinitely without rotting.

THE CALIFORNIA STATE HIGHWAY RUNS THROUGH THE REDWOOD DISTRICT

In going to the redwood country from San Francisco, the first important group of trees encountered is the Montgomery grove, which lies a few miles west of the highway north of Ukiah, but about fifty miles north of Willits the redwoods begin to appear along the highway in small and scattered groups.

The beauty of the roadway could be greatly enhanced by saving these small groves and scattered trees. Their ultimate preservation, however, will depend entirely on the ability of the California Highway Commission to secure a right of way of sufficient width. This has not been done as yet, and farther north, in an effort to avoid expense, the Commission actually purchased a right of way subject to the condition that the owners should remove the timber from it. In other words, a highway was planned through the redwoods to carry visitors to see the trees, and then arrangements were made to have the timber removed. This action was largely taken owing to the widespread, but mistaken, belief that it is impossible to save a strip of timber if the protecting trees on either side are removed. However, California is awakening to the necessity of employing landscape engineers, who will prevent all unnecessary vandalism.

The first important redwood groves are at Hicks' Camp and about twelve miles south of Garberville, at the Stern's Camp grove, the latter comprising some ten acres on a fine level bottom about 300 yards wide. At this point one is forced to recognize the fact that any State park in connection with the highway must include the entire erosion valley of the South Fork of the Eel from crest to crest. The skyline, with its superb trees, is as essential as the bottom flat and much more important than the intermediate area.

The river valley is narrow—in fact, little more than a wide gorge with a level bottom—and the timber on the slopes has less commercial value than that upon the flat. If the timber along the highway is to be preserved, a relatively small amount of additional cost would protect the entire valley.

At Red Mountain there is a fine grove of redwoods, and to the north of that the first cutting was made in 1919. From this point on it becomes evident that the right of way, 100 yards wide, acquired by the California Highway Commission, is not only insufficient, but has actually served to invite logging operations.

The contour of the South Fork of the Eel is such that the highway, with a strip of timber on each side, can be preserved easily without danger of destruction from winds, if due consideration is given to the topography of the ground.

THE WORK OF CENTURIES DESTROYED FOR GRAPE STAKES

It is scarcely necessary to dwell on the need to put an end to the destruction of the oldest and tallest trees on earth. The cutting of a Sequoia for grape stakes or railroad ties (and an eighteen-foot tree along the new State highway was cut a few months ago for that purpose) is like breaking up one's grandfather's clock for kindling to save the trouble of splitting logs at the woodpile, or lighting one's pipe with a Greek manuscript to save the trouble of reaching for the matches.

After the fall of the Roman Empire the priceless works of classic art were "needed" for lime, and statues by Phidias and Praxiteles were slaked down for this purpose; but the men who did it are today rightly regarded as "vandals and barbarians."

Photograph from Charles Willis Ward

WHEREVER THE REDWOOD IS FOUND AT ITS BEST ONE MAY BE SURE OF A DAILY FOG BATH

This photograph shows the sunbeams breaking through the fog as it begins to lift and dissolve. This usually occurs about 9 or 10 o'clock each day during the summer season. Sometimes the forests are so wet that the dripping of water from the high crowns is like a thin rain.

North of Garberville there was much lumbering for railroad ties and grape stakes during the summer of 1919. The cutting was in every case done along the east bank of the South Fork of the Eel River and on the very edge of the highway, and while the devastation was appalling, the damage, if stopped now, can ultimately be minimized.

Farther north the cutting begins to appear at scattered points, but one of the finest groves, a tract of 700 acres belonging to the Hammond Lumber Company, has been left untouched.

A little farther north there is a fine stand of timber owned by the University of Minnesota, and it is to be hoped that this educational institution will coöperate in preserving these trees. From here on there has been much destruction at various points along the road.

After these scenes of devastation and threats of worse, the traveler reaches Bull Creek Flat, perhaps the finest forest in the world. Bull Creek enters the South Fork of the Eel just above Dyerville, and here is a magnificent stand of trees, some 10,000 acres in extent.

If all the forested area needed in connection with the State highway be taken from the upper reaches of the South Fork down to the mouth of Bull Creek, the reservation will contain about 10,000 acres. Bull Creek Flat, with the grove opposite, at Dyerville, will add 10,000 acres, making a total of from 20,000 to 25,000 acres, the minimum for a State park, which in point of fact should be larger and extend northward along the west bank of the main Eel River.

Bull Creek Flat belongs to the Pacific Lumber Company, except two sections in the upper part, which are the property of the Metropolitan Lumber Company. The officials of both these companies have expressed their sympathy with the park project, so far as it relates to Bull Creek Flat. This tract is said to contain one enormous tree, possibly the largest redwood and the tallest tree in the world.

STATE AND NATION MUST BUY BACK THEIR GIFTS

The fundamental tragedy of the whole redwood situation lies in the fact that the great trees are nearly all in the hands of private owners, who cannot reasonably be expected to sacrifice their holdings for public benefit. The State and nation, having given away these lands in the past, must now buy back at least a large portion of them.

On the east bank of the Eel River, for many miles below the forks, there are very few redwoods within sight of the highway except at Fortuna, where 2,300 acres of fine trees have been preserved temporarily and are known as the Carson Woods. This grove is a mile or so east of the highway and should be preserved as a local park.

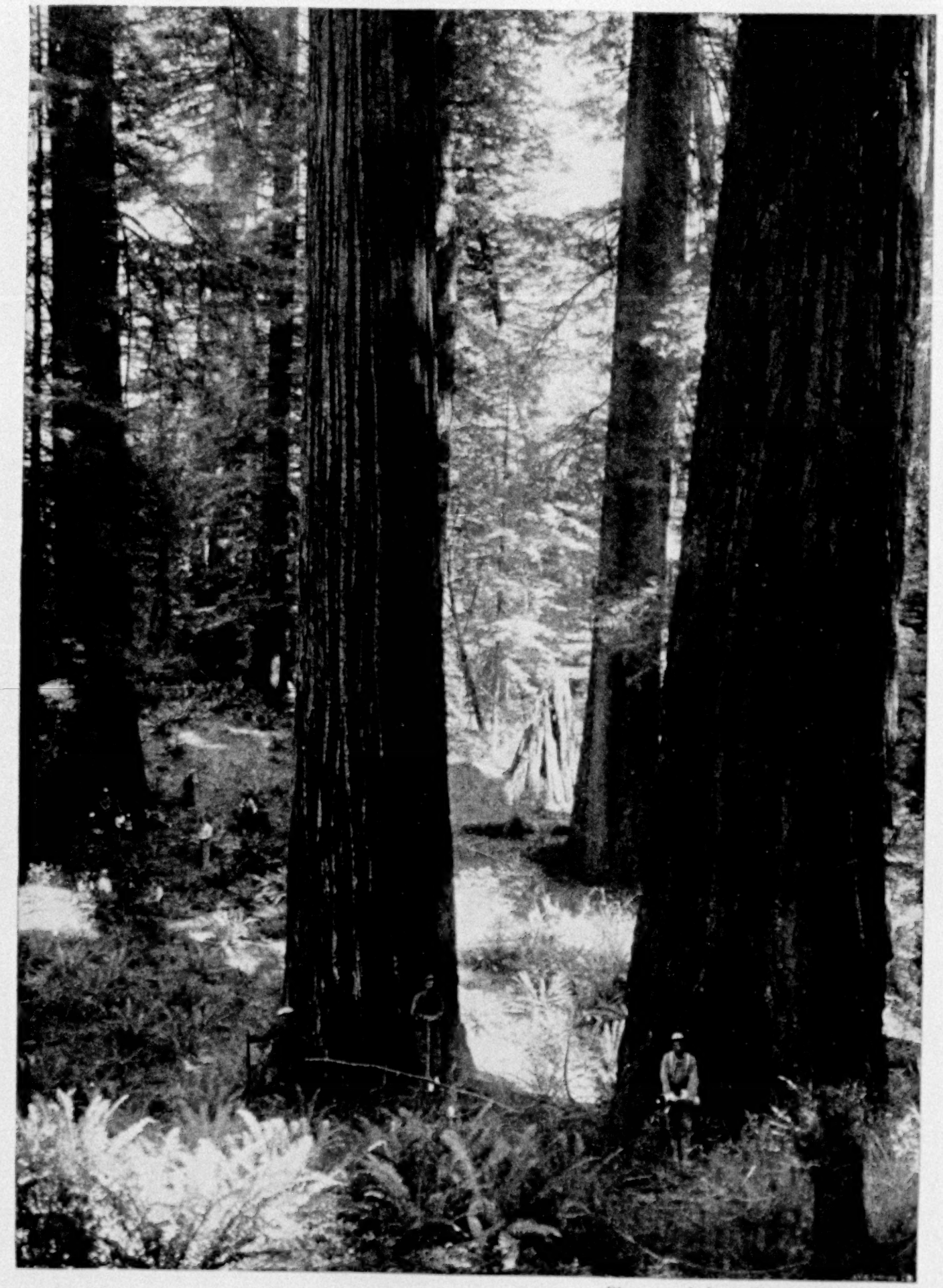
SPROUTING SAPLINGS HAVE BEEN DESTROYED

Along the lower stretches of the Eel River below Scotia a lumber company is said to have checked reforestation by cutting, during successive years, the sprouting saplings which bravely tried to lift their heads around the old stumps. This was done under the impression that the land could be made available for pasturage. It has proved a failure, and the only result has been to destroy in many places the chance of the forest recovering.

Below the forks, on the left bank, there is a magnificent stand of trees, extending from the water's edge to the crest of the main slope, nearly all of which belongs to the Pacific Lumber Company. This area is some 20,000 acres in extent, and the highway runs through it. It should be preserved, although the cost would be great because of the size of the tract and the fine quality and thickness of the timber. Below this forest the timber on both sides of the river has been almost entirely destroyed.

At Orick, on the Big Lagoon, the highway passes through the lower end of the Redwood Creek grove, one of the very best stands of redwood in Humboldt County, approximately 50,000 acres in extent. The redwoods are largely mixed with spruce and the ground is carpeted with ferns of great abundance and variety. This stand is as yet untouched and should be saved for a national park, because the timber, being inaccessible, can be acquired at a relatively small cost.

One of the most conspicuous features of these redwood forests, especially in Del Norte County and the northern portions of Humboldt, is the profusion of



Photograph from Charles Willis Ward

A BEAUTIFUL CAMPING GROUND

There are hundreds of beautiful camping grounds in the timbered regions of the California coast. The owner of this tract has cleared off a number of spots and put them in shape for the use of visitors. June, July, August, September, and the greater part of October are splendid months for camping. The Interstate highway passes along this tract about two miles to the westward.

ferns, of which there are said to be some thirty species.

The protection of the California redwoods is now the subject of anxious solicitude on the part of many citizens, but the practical means of achieving this result are in the hands of the Redwoods League. There are two distinct movements on foot. First and of instant need are the efforts made by Humboldt County and by the Redwoods League to stop the cutting along the highway on the South Fork of the Eel River.

OPTIONS PURCHASED BY TWO LOVERS OF THE REDWOODS

This has been substantially accomplished, and since August, 1919, all the cutting has been stopped by the purchase of the land on which lumbering operations were here carried on. This was made possible through the munificence of Mr. Stephen T. Mather and Mr. William Kent, each of whom donated $30,000 to be used in the purchase of options on the threatened areas.

These options have since been taken up by the Supervisors of Humboldt County, a body of men having rare foresight. Humboldt County expects to provide a bond issue on a large scale, which will secure the preservation of the groves most in danger, but the bulk of the money needed must be provided by the State of California. The necessary bond issue will shortly be brought before the people. It has been sponsored by the Governor and has the active support of the most influential men in the State.

In addition to this, the Redwoods League has succeeded in enlisting the support of many public-spirited lumbermen and owners of timber, who propose to donate at least a portion of their holdings for park purposes, especially along the highway.

The extent of this redwoods park has been definitely determined as the entire valley of the South Fork of the Eel River from the point where the redwoods begin down to and including Bull Creek Flat and Dyerville Flat. If, in addition, funds can be provided to purchase any or all of the 20,000 acres of redwoods on the left bank of the main Eel farther down stream, a superb reserve would be established.

The Eel River redwoods constitute the most immediate problem, but there is also a very definitely formulated plan to provide a National Redwoods Park. A national park requires a large area, with sufficient isolation and compactness to admit of proper administration. There are three such areas available: 1st, the grove along Redwood Creek, of about 50,000 acres in extent and peculiarly adapted for a national park; 2d, the groves along the Klamath River, as yet untouched and of great beauty; 3d, the Smith River groves, in Del Norte County. A complete survey, such as is now being undertaken by the Redwoods League, will be necessary to determine the relative suitability of these three groves for a national park.

THE REDWOODS LEAGUE

The "Save the Redwoods League" was formally organized in San Francisco in July, 1919.

The league is under the executive control of Dr. John C. Merriam, of the University of California, Berkeley, Calif., and its purposes are:

(1) To purchase redwood groves by private subscriptions and by county bond issues.

(2) To secure a State bond issue to buy the finest redwood groves along State highways.

(3) To establish, through Federal aid, a National Redwoods Park.

(4) To obtain, through State and county aid, the protection of timber along the scenic highways now in course of construction throughout California.

(5) To encourage the State to purchase cut-over redwood areas for reforestation by natural means or by replanting where repeated fires have made sprout reproduction impossible.

Committees have been formed also to study the subjects of redwood distribution, variation, and the most efficient commercial use of redwood products, in the belief that nearly all the purposes for which this lumber is now used can be adequately served by *second-growth trees*.

REDWOOD GROVES IDEAL MEMORIALS

One of the first results of the activities of the league has been the donation by

Dr. John C. Phillips, of Boston, of a large sum of money for the purchase of a redwood grove as a memorial to his brother-in-law, the late Colonel Bolling, who fell under circumstances of great heroism in the late war. No more beautiful or effective memorial can be imagined than a grove of these trees, the very name of which, *sempervirens*, is redolent of the idea of immortality.

If those who desire to preserve in a permanent form the memory of their dead would join in a movement to set aside memorial groves, the whole problem of the preservation of the redwoods on a very large scale would be solved. If a tithe of the gold now squandered in ugly and costly monuments, which desecrate the cemeteries throughout the land, were spent on trees, the world would be fuller of beauty and possibly more grateful to those who supplied the money.

In addition to donations of money and trees for such memorial purposes, the league expects to find sympathetic and cordial support for the park among the lumbermen. They know only too well the value of the timber. The timber is their property, and their business is to cut and to realize on it.

It is not fair for a community to ask them to hold this timber, to pay taxes on it, and then to sacrifice their financial interests for the public welfare. It is the duty of the county, the State, and the nation to purchase their holdings at the proper value.

The question involved is not local; it is a State, a national—in fact, an international—concern, as the benefit derived from the preservation of the redwoods will be for the people of the nation and the world at large. There is no reason why the lumbermen should abandon their interests without adequate remuneration, although in many cases individuals and companies will donate a certain portion of their timber or sell at low figures.

If the State, before building the highways which made the timber accessible, had approached the lumbermen and made it a condition precedent that a strip of timber on each side of the road should be donated, no doubt in many cases the lumbermen would have found it greatly to their interest to accept the proposal. The fact that this was not done was the fault of the State, its highway commission, and its legislature, and not the fault of the lumbermen.

Experience has shown that the only effective, persistent, and intelligent conservators of wild game have been sportsmen who have evolved from game-killers into game protectors, and personally the writer believes that the lumber owners themselves, who are among the finest men on the coast, will be found to be most generous and helpful in any scheme looking to the preservation of the timber.

It will cost money to preserve the redwoods—many millions of dollars; but California has no choice. Either the amount needed to save the groves must be supplied today or else a far greater sum will be required ten years hence to purchase a butchered and isolated tenth part of the forests.

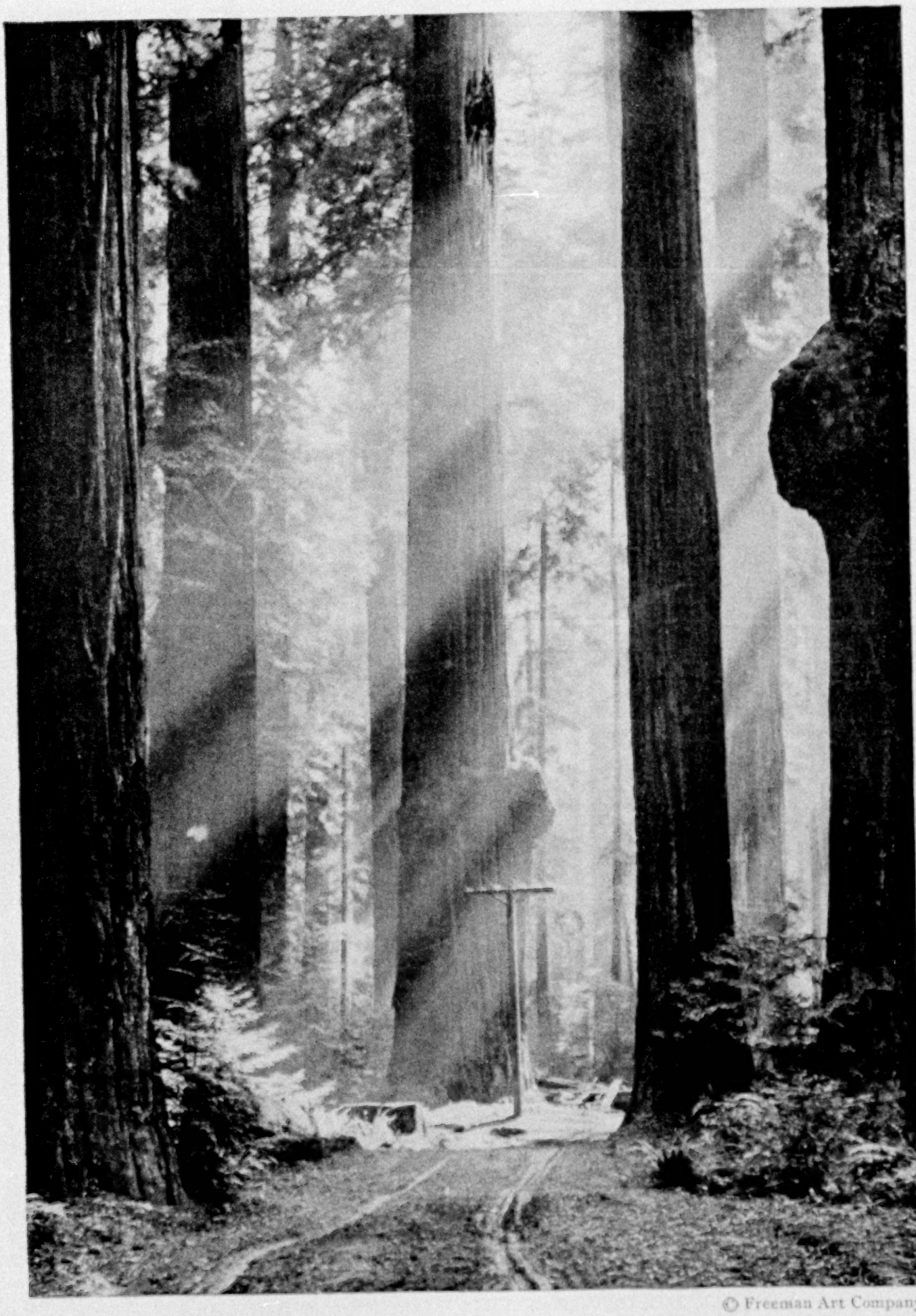
REDWOODS NEVER CAN BE REPLACED

If the groves are bought in their present condition and at relatively small cost, it will be a great innovation, because heretofore Americans have followed the wasteful policy of recklessly exploiting wild life, forests, and streams, and then, as soon as the destruction is complete, the policy is changed, game is reintroduced, and attempts are made to reforest the mountains at vast cost. But redwoods never can be replaced.

Of course, lumbering must go on; but most of the purposes for which redwood is now being used can be served from second-growth timber, and there are vast areas of denuded, devastated, and lumbered-over lands which can be made in a few years to supply all the timber needed.

It probably would not be desirable, even if possible, to preserve all the redwood timber now standing, although as standing timber it is perhaps worth to the State many times its value as lumber. This is true, even from an investment point of view, because the value of the timber is increasing by leaps and bounds.

All this is entirely aside from the sentimental considerations against destroying trees of such great age, size, and beauty. No one who has seen these groves can fail to love them. Nature has been so bountiful to California that the Californians are trustees, for the rest of the world, of many of these priceless heirlooms from a distant past.



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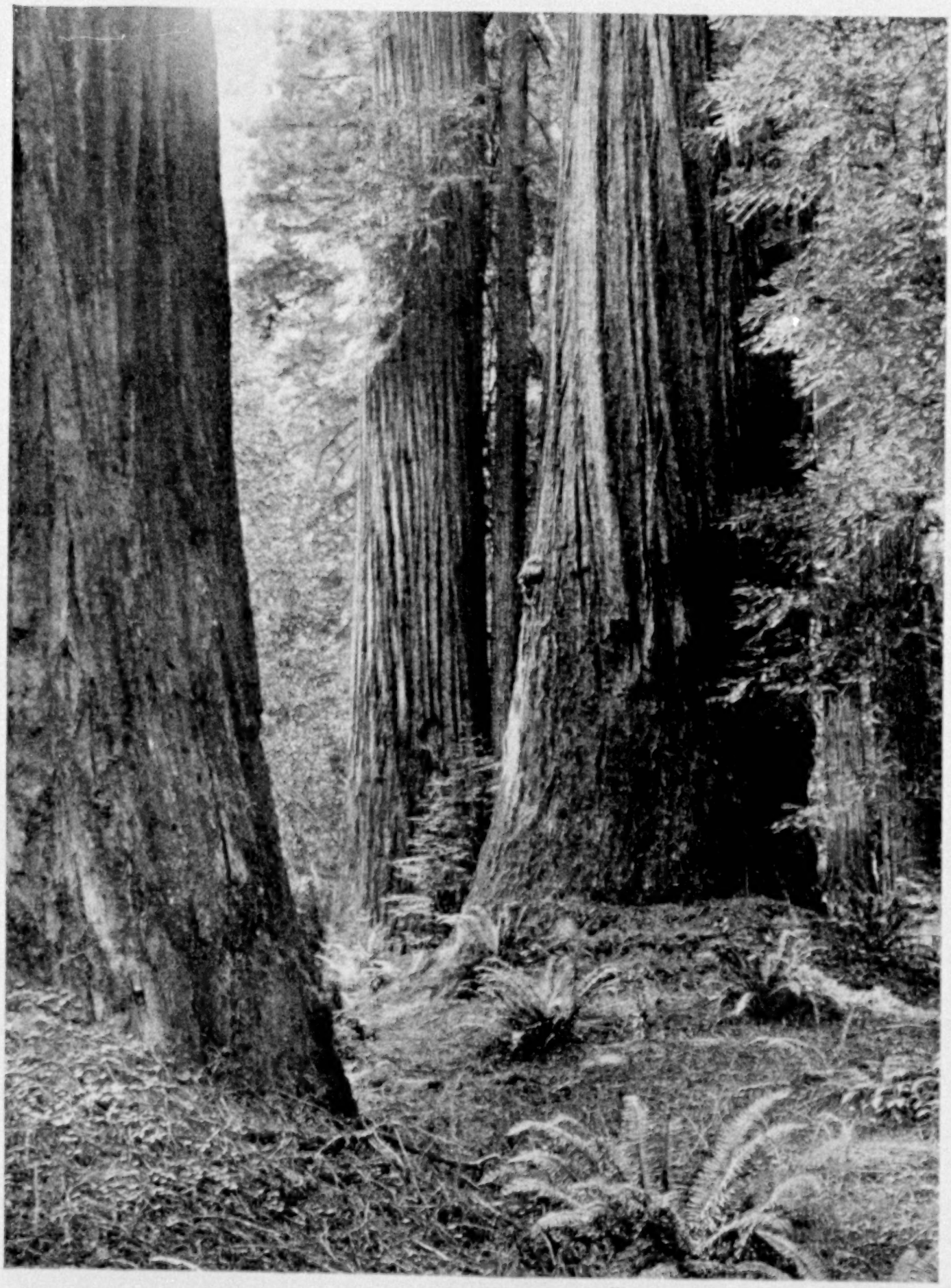
RAYS OF SUNSHINE FILTERING THROUGH REDWOODS NEAR DYERVILLE, CALIFORNIA

The telegraph pole in the middle distance serves as a "yardstick" with which to measure the height of these splendid trees. The redwoods are evergreens, the leaves remaining three or four years after they develop. One of the admirable qualities of this species is its imperviousness to decay, a fact which makes it extremely desirable for the foundations of buildings.



Photograph from Charles Willis Ward

THE REDWOOD IN THE CENTER OF THIS ILLUSTRATION HAS A DIAMETER OF TWENTY-TWO FEET

This species, the *Sequoia sempervirens*—immortal Sequoia—not infrequently attains a height of more than 300 feet. Some specimens have been found which tower aloft 340 feet, and it is predicted by lovers of these giants that the *tallest tree on earth* will be found either in Bull Creek Flat or along Redwood Creek, California.

PERU'S WEALTH-PRODUCING BIRDS

Vast Riches in the Guano Deposits of Cormorants, Pelicans, and Petrels which Nest on Her Barren, Rainless Coast

By R. E. Coker

With Illustrations from Photographs by the Author

PERU is preëminently a land of contrasts. A visitor standing upon some moderate eminence by the sea may gaze alternately upon the broadest extension of ocean's smooth surface and the highest and most battlemented mountains of the continent.

If his vision weary of the barren desert stretching between sea and snow-clad peaks, he has but to turn in his tracks to refresh his eyes with the beauty of a verdant tropical valley, where brightly colored birds flit among trees and shrubbery and tropical fruits are watered by melted snows.

The daylight about him is perhaps as brilliant, as dazzling, as sunlight may be upon earth, while he breathes deeply the moderately cool sea breeze blowing fresh from the mighty Humboldt Stream.

He will become enervated by the rays of the tropical sun pouring direct from the zenith, but he may stroll down to the beach and plunge into a surf as cool and invigorating as that of Martha's Vineyard or Monterey.

The paradoxes of Peru might be multiplied, but our interest lies not immediately in these. Rather we are concerned with other links in the chain of circumstances arising from the same fundamental geographical causes.

WHY PERU'S COAST IS RAINLESS

The Humboldt, or Peruvian, Current, supplemented no doubt by the upturning of cold bottom waters, maintains its steady course for thousands of miles, from icy Antarctic latitudes to the Equator. Thus it is that tropical shores are bathed by cold ocean waters, and, with this fundamental contrast, the stage is set for an array of phenomena not fully paralleled in any other part of the world.

Only two events in that interesting series command our present attention. These are the absence of rainfall and the consequent accumulation, through centuries untold, of a mine of wealth which might have been dissipated by a few seasons of rain.

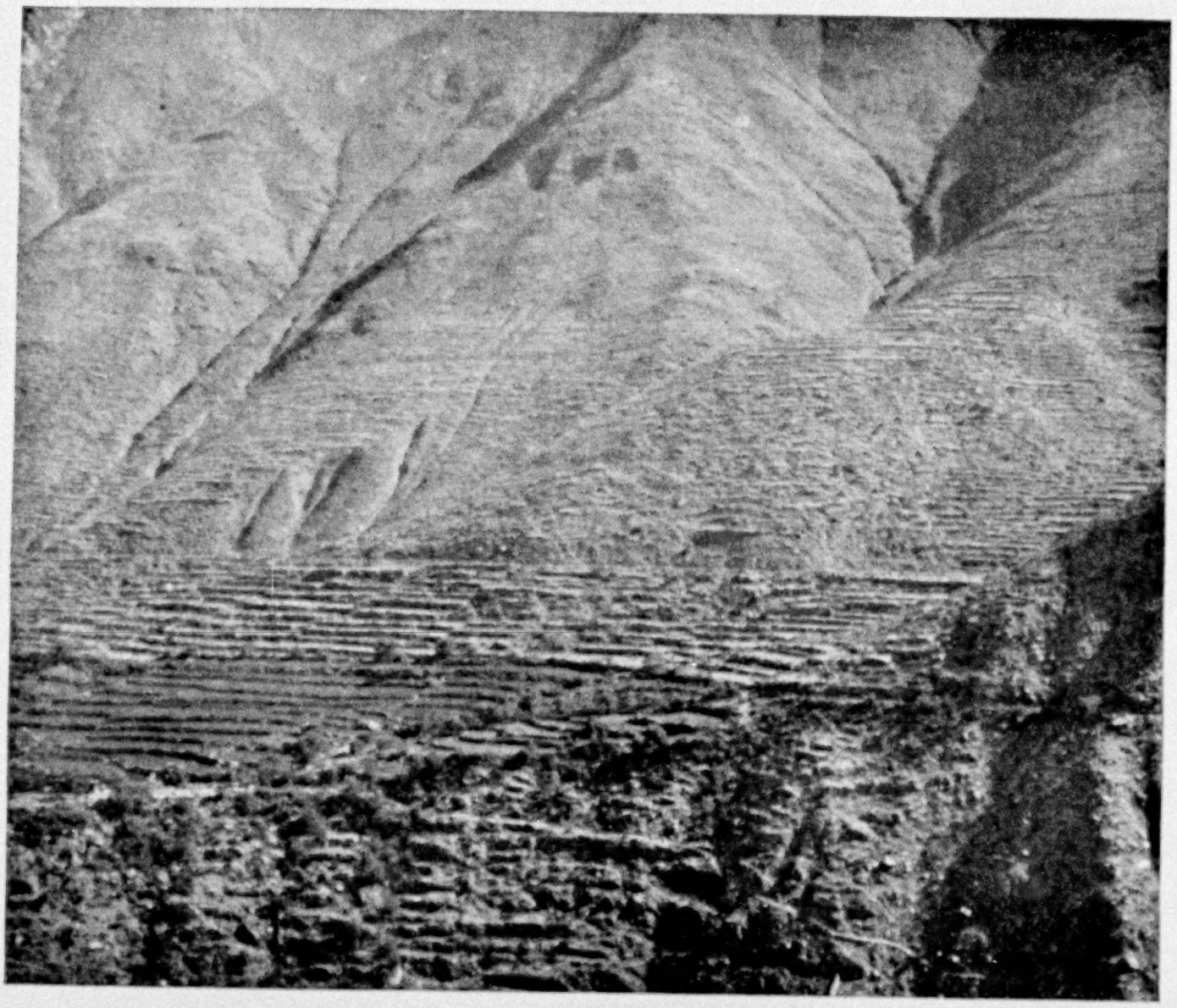
The cause of rain, of course, is the cooling and contraction of a moisture-laden atmosphere. We may think of a wet sponge that is squeezed and forced to give up its water; but when a moist, cool breeze is warmed over sunny lands, it is as if a compressed damp sponge were allowed to expand; instead of giving up water, the sponge is drier than before.

So, when the winds blowing cool from the surface of the Peruvian Current touch the lands that are warmed beneath a tropical sun, expansion or rarefaction occurs, rainfall is prevented, and the atmosphere is dry.

PERU'S DRY ATMOSPHERE PRESERVES ITS GUANO WEALTH

The significance of this, with respect to the famed guano deposits of Peru, easily becomes apparent. In climates of common atmospheric humidity, however numerous the sea-fowl that nest or rest upon islands or mainland, the nitrates of the guano give rise to ammonia and are wasted by evaporation or seepage; but when, as in Peru, year after year guano is laid down beneath a clear, dry atmosphere, the deposit bakes in the sun and its most valuable components are imprisoned for an indefinite period.

Guano, it will be understood, is primarily the deposit of fish-eating birds, into which may be mixed and incorporated—in greater or less proportion—a variety of other substances, such as the



OLD TERRACES ON THE STEEP SIDES OF THE GORGE OF THE RIMAC, WHICH THE PERUVIAN FARMERS OF AN EARLY CIVILIZATION ENRICHED WITH THE GUANO GATHERED ON THE RAINLESS COAST

The ancient Peruvians developed the practice of irrigation to a remarkable degree. Under modern conditions, only the bottom, showing dark in the photograph, is under cultivation. Guano was conveyed from the islands to fertilize such interior farms (see text, page 541).

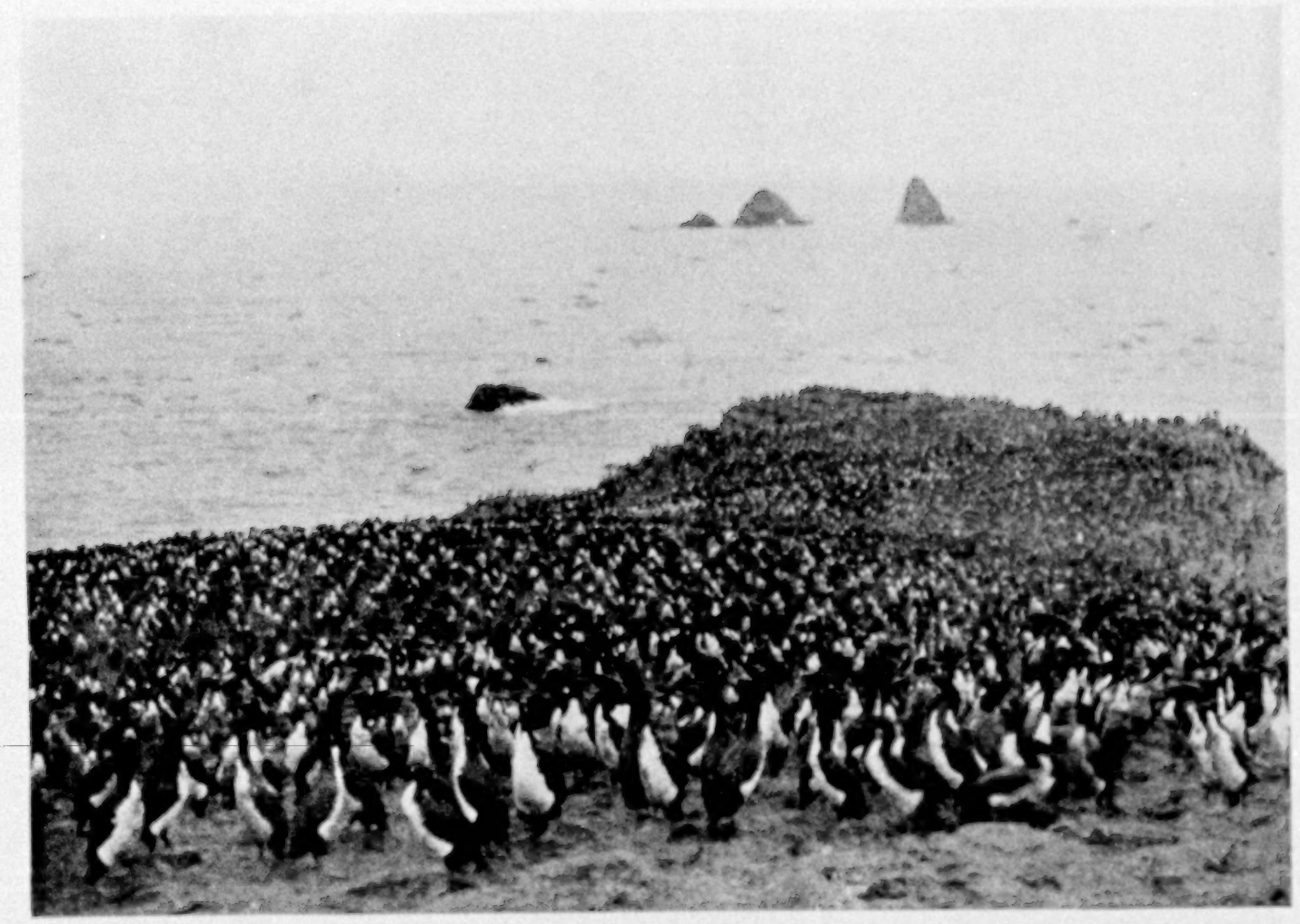
eggs and bodies of birds and the deposits and the bodies of sea-lions. It may be found mixed with gravel and sand in very small proportion or sometimes to an extent rendering it unprofitable to extract.

Great beds of guano have been formed upon islands of the Caribbean Sea; upon others off the coast of Africa; and upon still others of the southern and far Pacific; yet these guanos are scarcely comparable to Peruvian guano, for in the moist climate prevailing upon such shores the nitrogen is soon lost in the form of ammonia, while the insoluble phosphates remain to form a far less valuable "phosphatic guano."

"Peruvian guano" is practically synonymous with nitrogenous guano and has long been recognized as the best nitrogenous fertilizer—that is, as a fertilizer of generally high nitrogen value in which the nitrogen compounds are found in a condition most readily assimilable by our plants.

PERU'S BIRDS HELP TO SUPPORT HUMANITY

Nitrogen is a primary necessity to the farmer. Whatever may be the importance of adding to the soil potash and other mineral components of our food and our clothing, there never exists a doubt as to the fundamental importance of nitrogen.



THIS FLOCK OF CORMORANTS FORMED NEARLY ONE THOUSAND TONS OF HIGHEST-GRADE GUANO IN ONE YEAR (SEE TEXT, PAGE 546)

This is the most important guano-producing bird of the rainless coast, and the native Peruvians long ago recognized this fact, giving it the name of *guanay*, meaning, apparently, "the guano bird." Guanays occur on the Peruvian coast from near the northern to the extreme southern boundary, but the principal habitat is the double group of islands off the port of Pisco—the Chinchas and the Ballestas.

Neither is there a doubt as to the critical nature of the practical problem of maintaining a supply of this element in a form available for agricultural uses.

Nitrogen exists in the atmosphere above and about us in almost incalculable quantities, but the problem of supply arises from the limited means and agencies for its fixation in a form in which it can be utilized. There is always a tendency, too, for this elusive element to return to Nature's great store, and it can be recovered again only by slow natural processes or expensive industrial methods. So often as the odor of ammonia arises from wastes or decaying substances, so often is nitrogen being lost—for the time—to further useful service.

Only within recent years have mechanical methods been devised to supplement the natural agencies upon which we have hitherto depended to make a small portion of the nitrogen of the world serve the purposes of man. But such methods are expensive, and doubtless for a long time we will continue to depend principally upon the utilization of organic wastes for nitrogen.

Consequently a peculiar interest attaches to birds of the Peruvian islands, which have long served to aid the world's agriculture and which, given due protection, may continue indefinitely to contribute materially to the support of humanity.

THE ANCIENT PERUVIANS PROTECTED GUANO-PRODUCING BIRDS

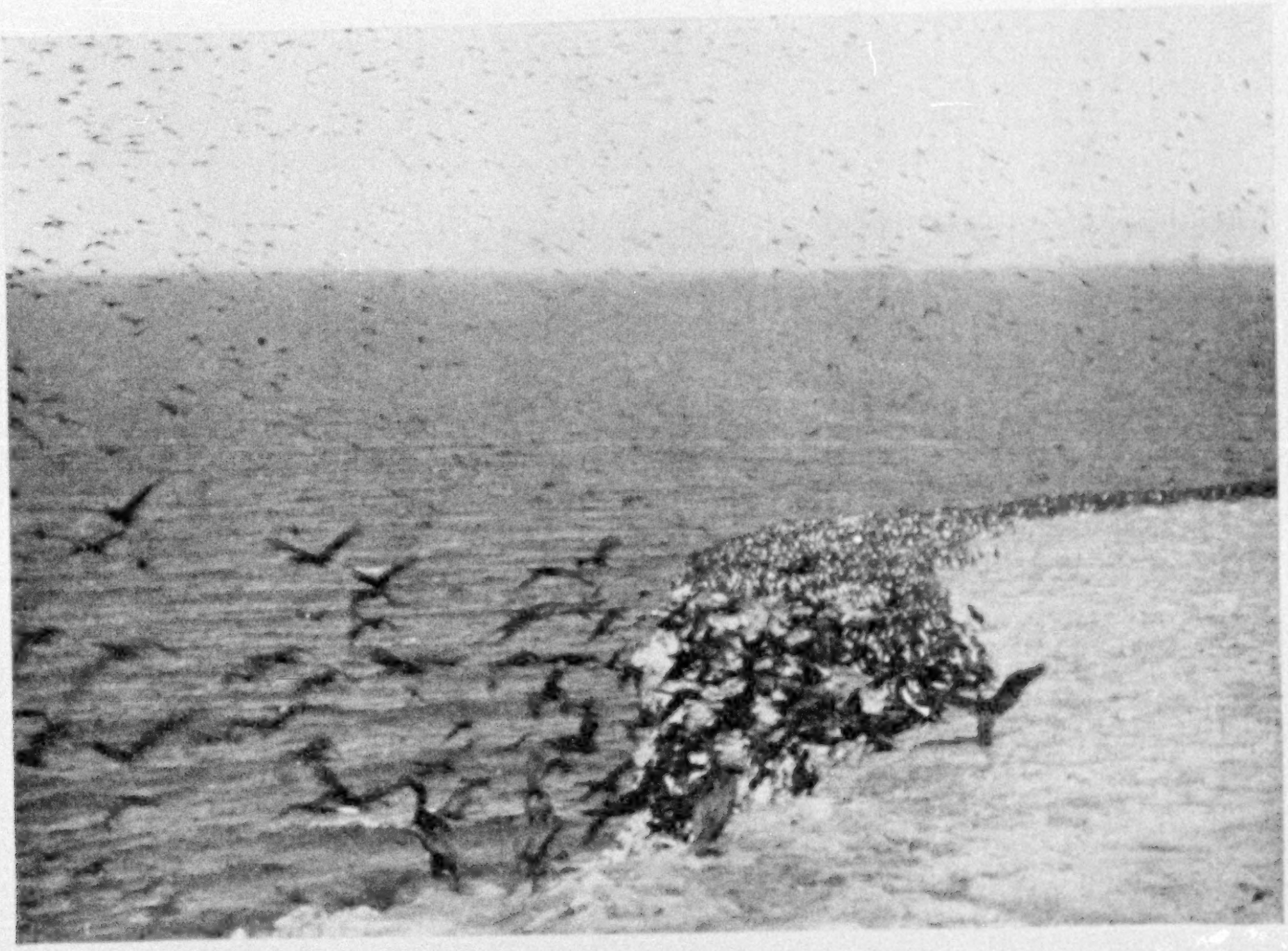
Peruvian guano has been imported largely into Great Britain, Europe, and the United States for many decades. Its employment as a fertilizer on the South American continent is far more ancient. Centuries before the beginning of mod-

A GENTLE SLOPE DOTTED WITH THE NESTS OF WHITE-BREAST CORMORANTS: CHINCHA ISLANDS

After the nests had been occupied for three years, an acre of the ground was covered with guano worth $60,000 or more. This rookery comprised about fifteen acres.

A GUANO-BIRD COLONY ON ONE OF THE BALLESTAS ISLANDS

The guanays well deserve their name. Their gregarious habits, their choice of level ground and gentle slopes for their nesting places, and their custom of remaining on land a large part of the time combine to result in the formation of enormous deposits of guano.



THE AIR AS WELL AS THE CLIFF-TOP IS ALIVE WITH GUANAYS

When walking, these birds suggest penguins, with their erect, waddling gait; in flight, they form long, black clouds, miles in length.

ern American agriculture, there existed on the west coast of South America a civilization of high attainments in agriculture, in textile industries, and in architecture.

The ancient Peruvians found their westward land a vast desert in its natural condition, except for a few narrow and fertile valleys traversed by inconstant streams. They might have confined their farming operations to the shores of these natural water-courses, but, as an aggressive and intelligent people, they extended their cultivated fields far over the naturally arid wastes.

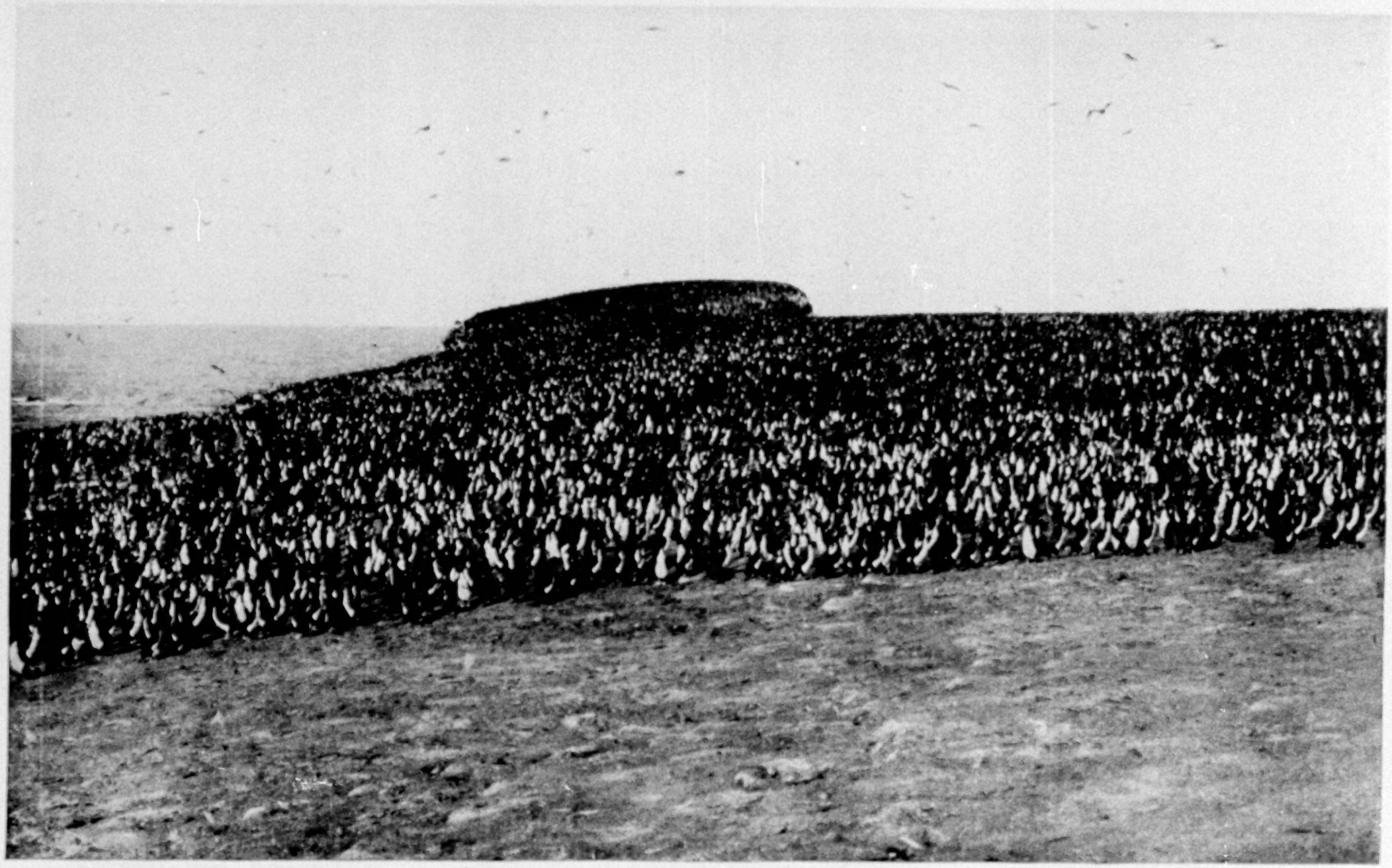
This they accomplished by developing a science of agricultural engineering marked by extensive irrigation works, with canals and ditches that followed the contours of hillsides, tier after tier, or pierced sharp ridges with remarkable tunnels.*

* See "The Staircase Farms of the Ancients," by O. F. Cook, in the NATIONAL GEOGRAPHIC MAGAZINE for May, 1916.

The great obstacle Nature had placed in the way of their agriculture being overcome, they found upon the coast and islands a unique compensation for their difficulties. The same conditions which made the lands naturally arid had also conserved to them the best of agricultural aids in Peruvian guano.

They took fertilizer from the islands to enrich the lands, even in the high altitudes of the montaña, two or three miles above sea-level. Incidentally they left in the kitchen-middens of the camps upon the islands relics of pottery and metal-ware suggestive of an origin of the guano industry dating back at least to an early period in our Christian area.

These early Americans appreciated the value of the producing birds, and they not only enacted most rigorous edicts for the protection of their feathered benefactors, but, according to the account of the Inca Garcilasso de la Vega, they so administered the industry of guano extraction as to make possible the effect-



A PORTION OF A FLOCK OF NEARLY THREE-QUARTERS OF A MILLION WHITE-BREAST CORMORANTS ON ONE OF THE CHINCHA ISLANDS: PERU

This flock nested on a triangular body of land between 20 and 30 acres in area—a rookery which for size and compactness can scarcely be equaled anywhere in the world.

ive conservation of the resources with which Nature had endowed them.

GUANO INTRODUCED IN EUROPE

With the Spanish conquest and the consequent decline of agricultural and industrial life, the guano industry fell away to a condition of insignificance until near the middle of the last century. Humboldt, about 1804, brought samples of Peruvian guano to Europe and advocated its commercial importation.

This great scientist and traveler is usually, but erroneously, given credit for the introduction of guano to Europe. He was indeed responsible for errors of statement that may have been deplorable in effect upon the future conduct of the industry of guano extraction. He attributed the guano to birds of land rather than marine habit and he supposed that current deposits were of the slightest importance. His statement furnished no incentive to the protection of the useful birds.

Up to about 1840, however, the beds remained virtually undiscovered to the foreign world. Existing then in practically undiminished quantity, the deposits represented the accumulation of thousands of years, lying in thick beds, exposed or deeply buried, and waiting only to be shoveled up and loaded into ships for conveyance to the markets of the world.

After guano was actually introduced to the foreign markets, about 1843, there began an era of extraction on a scale hitherto unknown. Islands were surrounded by vessels, fifty or more at a time, and each year saw the disappearance of hundreds of thousands of tons.

DEPOSITS MORE THAN 100 FEET DEEP

It is stated that more than ten million tons were extracted between 1851 and 1872 from one small group of islands, representing an average annual exportation to the value of twenty or thirty millions of dollars. A single island, it is said, was lowered more than a hundred feet by the removal of its thick crown of guano.

The possibility of exhaustion of the deposits was not then contemplated, and no thought was given to conserving the birds.

While private fortunes were being gained, the government was making and executing great plans for public improvements, and the future of the guano industry was heavily mortgaged to defray the expense. Cries of warning came from the country's creditors, as rumors of probable exhaustion spread abroad and threatened the security of foreign-held bonds.

On all sides there appeared a mass of literature in the form of notes, pamphlets, and books that dealt almost as much in invective, charges, and countercharges as in actual analysis of the situation. A readjustment was finally made in the last decade of the century and the industry has continued both for home agriculture and for export, but in a regularly declining condition as regards the export trade.

THE SEA SUPPLIES THE FOOD FOR THE GUANO-PRODUCING BIRDS

The innocent agents in the production of the mines of wealth that were the basis of this world-wide commotion were the numerous sea-fowl of the coast, which found their abundant food in the ocean and made their nests upon the islands or points of shore.

The peculiar climatic conditions previously mentioned offered merely the proper environmental conditions for the preservation of the product. The primary requisite for abundant bird life is the existence of a plentiful food supply, and this is found in the schools of small fish, called anchobetas, that swarm in the Peruvian Current. There "shoals" of fish, acres in extent, are often pursued in the water by bonitoes and other large fish, while beset from the air by thousands of birds.

Billions of pounds of fish must be consumed each year by the birds, besides the incalculable quantity devoured by other fishes; but the fecundity of the anchobetas is such that their numbers are still maintained. At times great areas of the sea are made red by myriads of small, brightly colored shrimp-like crustacea: and these, too, play a part of importance as food for the fishes and birds.

Not all of the birds are of equal importance from the commercial point of view. Indeed, three species virtually support the guano industry at the present

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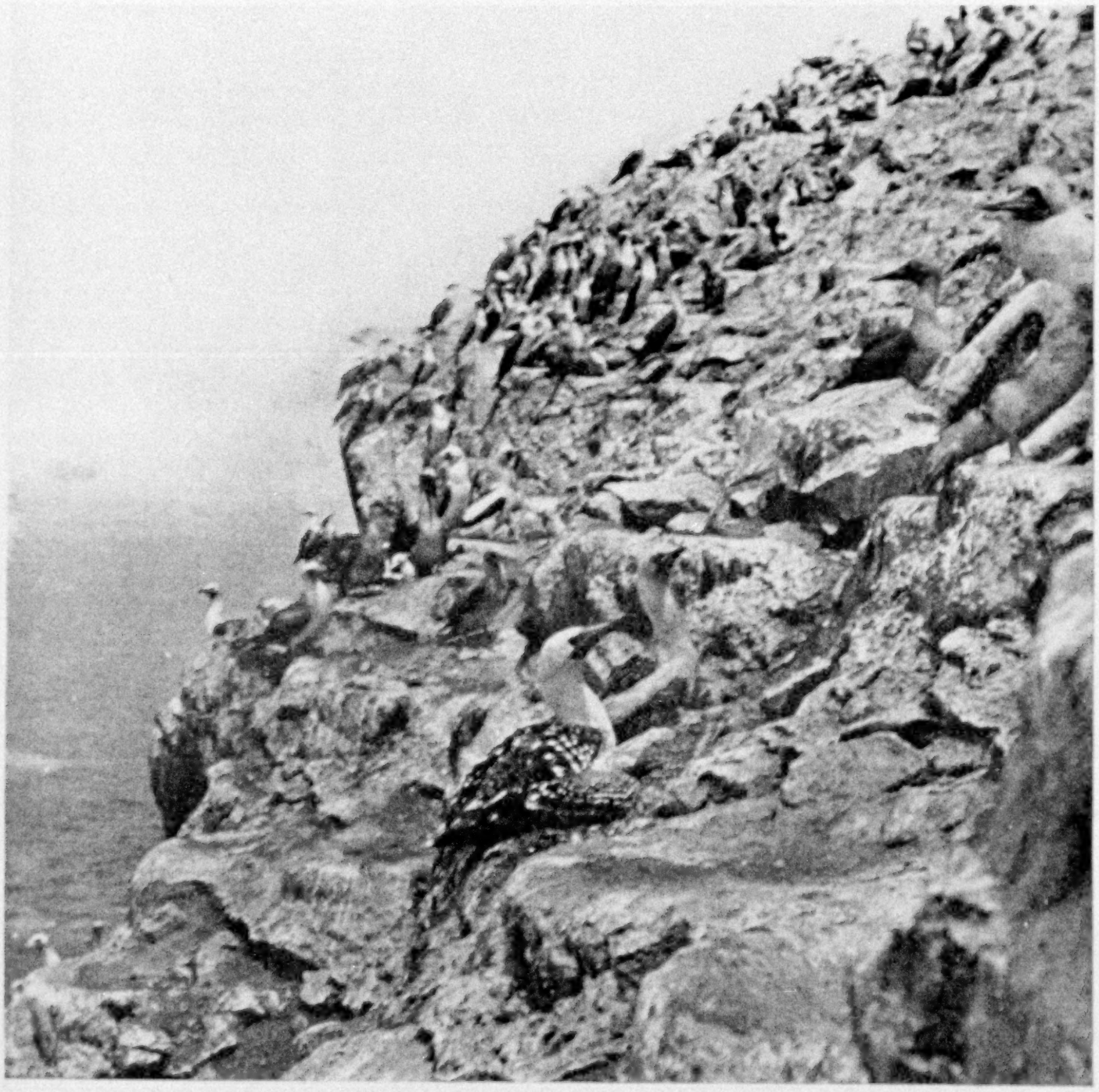


PIQUEROS COVERING THEIR YOUNG: GUANAPE ISLANDS

The piqueros are the most abundant of Peru's sea-fowl and would rank first among guano-producers were it not for the fact that they build their nests on cliffs and in places inaccessible to guano-gatherers.

time—the white-breast cormorant (*guanay*), the big gray pelican (*alcatraz*), and the white-head gannet (*piquero*).

"THE GUANO BIRD"

Of less present significance are the cave-dwelling penguin and the small diving and burrowing petrel, the latter flying back and forth by night from the high seas to their subterranean homes. All the birds, however, so far as they use the islands for breeding or for resting, contribute in some measure to the general supply of guano.

Three species of cormorant are numerous on the mainland coast and islands of Peru. They are pronouncedly distinct in plumage and in habit and of equal interest to the naturalist, but only one is of particular economic significance. The white-breast cormorant is the most important guano-producing bird of the coast, and the native Peruvians, having long recognized it as such, have called it *guanay*, meaning, apparently, "the guano bird."

Strangely enough, many writers have not recognized this bird as the principal

guano-producer, possibly because, in spite of its abundance, it is less familiar than many others. One may not visit a pier without hearing the grunts of black cormorants, one may hardly take the briefest trip on the water without seeing the scarlet-foot cormorant scurrying low over the surface; yet a visitor may remain in ignorance of the most abundant species of cormorant, the guanay, unless by chance his boat pass near a cloud of thousands or hundreds of thousands, or unless the solid black crest of some islet be pointed out as a rookery. Not infrequently, indeed, they form small rookeries, but it is typical to find them in immense aggregations.

Guanays occur on the Peruvian coast from near the northern to the extreme southern boundary, but their preëminent home is the double group of islands opposite Pisco, in the south, the Chinchas, and the Ballestas.

NEARLY 14,000 NESTS IN AN AREA OF 5,500 SQUARE YARDS

When the Ballestas were visited by the writer, in May, each of the three islands had large flocks of guanays, all of which, however, had been disturbed since the opening of the season for guano extraction.

The smallest of the three flocks had occupied the southwest corner of the north island on comparatively level ground beyond a bluff. The main part of the rookery was bounded by straight lines, being 93 yards in length, with an average width of 59 yards. The area was, therefore, approximately 5,500 square yards, within which were nearly 14,000 nests.

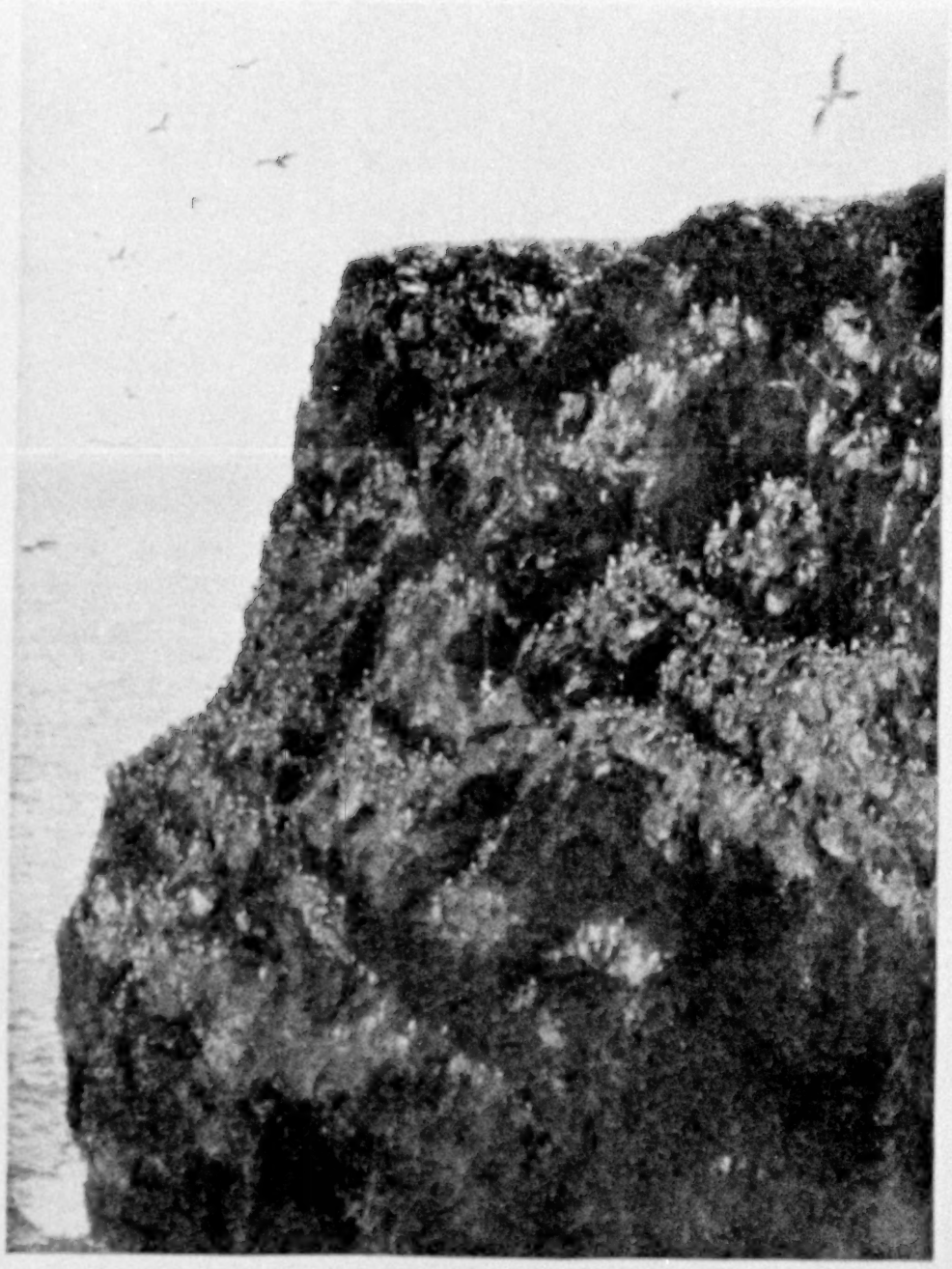
The south island of this group is some 300 feet in height and difficult of ascent. Its small top was nearly half covered with birds in a compact rookery of between eleven and thirteen thousand square yards. The middle island maintained a rookery of nearly equal size. In all, about 150,000 birds had nested upon these three islands during the preceding season.

A DISTANT VIEW OF THE PIQUERO ROOKERY SHOWN ON THE PRECEDING PAGE

The foam from the surf, in the distance, is seen streaming away to the north, in the Humboldt, or Peruvian, Current.

These flocks seemed large, and where the casual observer immediately says "millions" one is almost reluctant to apply the cold criteria of tape-line measurement, nest-counting, and simple arithmetic; yet, upon visiting the Chincha Islands in the following month, the rookeries hitherto observed seemed insignificant.

Upon the south island of the Chinchas, a small and generally triangular body of land between twenty and thirty acres in area, there was a rookery which for size



A TYPICAL NESTING PLACE OF PIQUEROS

The piquero, or Peruvian gannet, is much more pleasing to the eye than the pelicans or the guano-producing cormorants. The adult bird is distinguished by snow-white head, neck, and breast and variegated back. It is swift and graceful in flight.

and compactness can scarcely be rivaled in any part of the world. Two illustrations herewith (pages 539 and 542) show small portions of the flock without duplication. Taken together they show considerably less than half of the entire aggregation.

The nesting ground occupied about two-thirds of the surface of the island, embracing the crown and the gentle slopes of the hill that surmounted its low bluff walls. The nests were very uniformly spaced, averaging nearly three to the square yard, and not a yard of ground within the outside limits of the rookery was unoccupied. In form and arrangement the nests appear as heavy rolled-rim basins stuck into the hillside (see p. 540).

GUANAYS GRUMBLE AT VISITORS

When one approaches the rookery the guanays crowd away with much grumbling, and when once a few birds arise in flight the movement is liable to spread through the entire flock, until hundreds of thousands are on the wing, even most of those that were too remote from the intruder to know the cause of the disturbance.

If one awaits motionless and with much patience, the birds, after a while, will return to the nests and gradually close in around the observer, until at last only a circle with a radius of three or four feet is left vacant.

While in every direction one is surrounded by acres of birds of the same species, the scene is peculiarly variegated. In one direction the birds face toward the intruder watchfully, and the thousands of snowy breasts make a glistening white ground spotted with black heads. In another direction they are all turned away, and the ground appears almost solidly black; or a thousand birds are seen in side view and the breasts show only as white streaks.

Other effects are presented, according as the birds are more or less compactly grouped. Near at hand the metallic green reflections from the heads, the green-lustered backs, sides, and legs, the showy white under sides and the hun-

IMMATURE PIQUEROS IN A ROOKERY ON ONE OF THE LOBOS DE AFUERA ISLANDS

There is scarcely an island or a high point of shore along the Peruvian seacoast whose steeper walls are not dotted with the nests of piqueros, also known as Peruvian gannets and camanays.

dreds of intent green eyes may well hold the attention.

The confused sound of countless croaking voices that rise or fall with the state of alarm in the multitude makes an effect comparable to the sullen mutterings of a disgruntled mob of human beings.

While some cormorants, when not nesting, seem to know the land only as a place from which to dive, guanays in multitudes will rest for hours upon the level ground. They generally walk more than their near relatives, and as an individual bird strolls about in its small circle, the erect, waddling gait inevitably suggests the penguin. At a casual glance the birds shown in one of the illustrations (page 542) might well be mistaken for penguins. In flight they form long, black clouds miles in length, streaming low over the water until they settle down to form a large, black blotch on the surface of the sea.

The guanay well deserves its common name. Its gregarious habit, its choice of the level places or more gentle slopes for nesting grounds, and its custom of remaining on the islands a great part of the time, all combine to cause the formation of enormous deposits of guano, from which there is little natural waste. The guano is also of exceedingly high value in nitrogen compounds.

In the region where this bird was most abundant, about the Chinchas and Ballestas Islands, the climatic conditions were most favorable to the preservation of the nitrates. It is doubtful if the guano of the Chincha and Ballestas Islands is ever wet from atmospheric moisture.

Even though these islands were visited by the writer during the winter months, when the *garua*, or Peruvian fog, prevailed upon the coast, the atmosphere was invariably dry and clear. Consequently the nitrates are effectively preserved, and 14 to 16 per cent and more of nitrogen may be found regularly in the comparatively new guanos, while even the ancient deposits showed nitrogen in proportion of 12 and 14 per cent.

When the islands were closed by the government, in 1906, from the period of

PELICAN ROOKERY ON WEST ISLAND OF LOBOS DE AFUERA

The pelican is the second bird in economic importance among the guano-producers of the Peruvian rainless coast. There are ten species of this bird, widely distributed throughout the tropical and temperate regions of the Old and New World. Most species nest in communities and usually on an island, the nests being rather crudely constructed of earth, gravel, and rubbish. The eggs vary in number from one to four.

The nesting pelican presents a fascinating subject for speculation: In a colony such as this, where the nests are packed together almost like eggs in a crate, each practically identical with all the others, how do the parent birds know their own nestlings? Yet, after a trip to the feeding grounds, sometimes miles distant, ten thousand birds return and each takes its place without confusion. There is no evidence of community responsibility in the pelican state. Every pair of birds provides for its own family.

When fishing the bird usually flies very close to the surface of the water, and when it sees its quarry it plunges obliquely, holding the bill in such a manner as to scoop the small fish into its enormous pouch. The long bill and neck may be thrust deep beneath the surface. Having imprisoned the fish, the bird holds the head up and the bill down, to drain off the water.

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THESE PELICANS ON THEIR NESTS SEEM OBLIVIOUS TO THE PRESENCE OF AN OBSERVER; THIS IS ONE OF THE ROOKERIES OF THE LOBOS DE AFUERA GROUP

"There exists a peculiar belief among many persons that the pelican is unaffected by disturbance, since the adults will often stand by their eggs or nestlings when molested." Note the eggs in the left foreground.

ACRES OF PELICAN NESTLINGS ON THE EASTWARD ISLAND OF THE LOBOS DE AFUERA GROUP

Shortly after this photograph was taken, guano operations were begun on this island; whereupon the rookery was abandoned by the birds.

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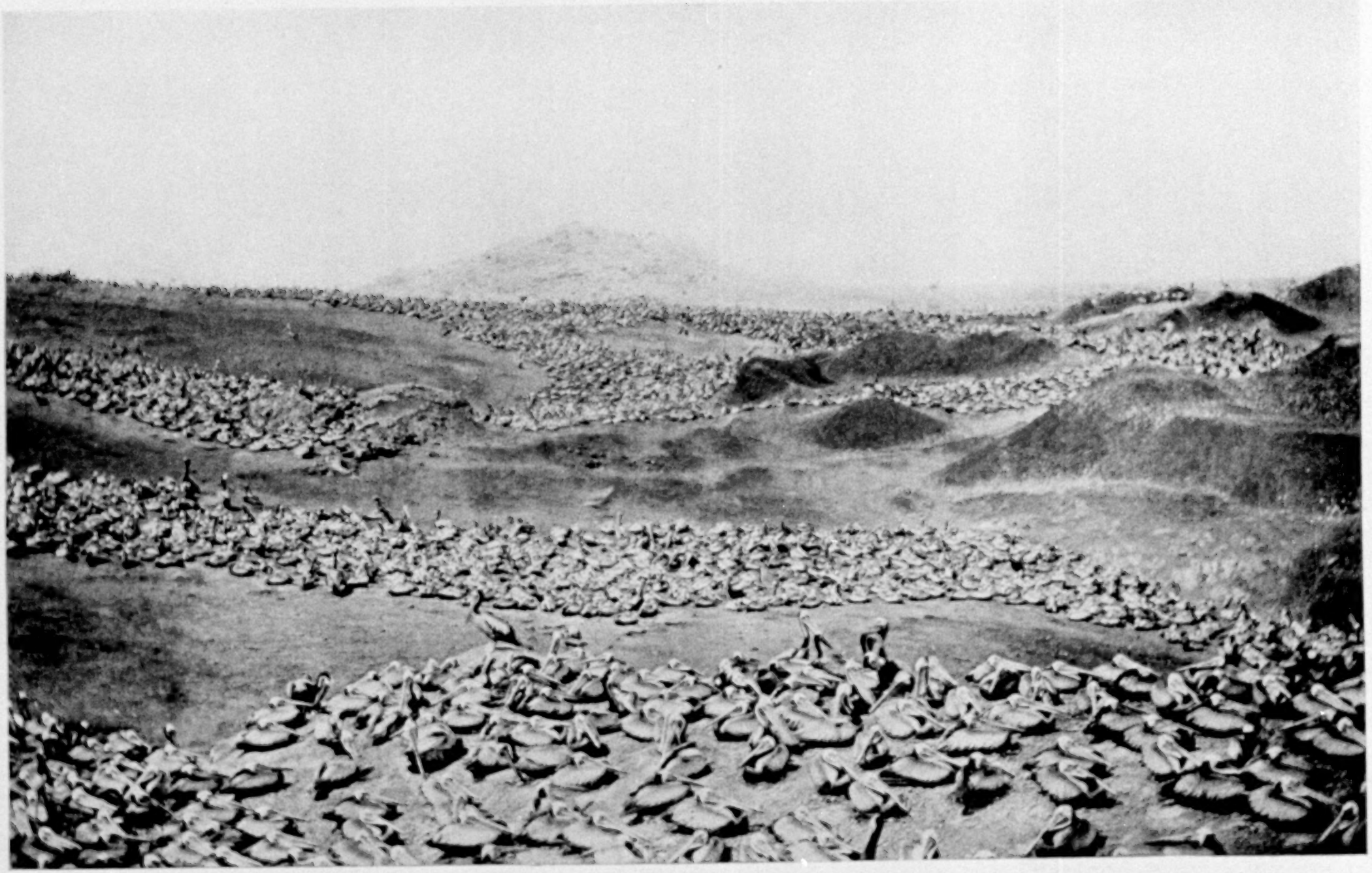


PELICANS ON THEIR NESTS: WEST ISLAND, LOBOS DE AFUERA GROUP

Only a portion of a flock containing between 20,000 and 40,000 birds is shown in the photograph.

November to March, inclusive, it was determined that the south island of the Chinchas should not be reopened for a period of years. The following summer, 1907, the island was visited, and it was estimated that about 5,000 tons had accumulated. The island was revisited in July, 1908, when the deposit was estimated at 12,000 to 15,000 tons. Extraction of guano was resumed in March, 1910 (after closure for three and one-third years), and the amount of guano taken amounted to more than 22,000 English tons.

BIRDS WORTH $15 A PAIR

It is evident that a pair of guanays, with their offspring, produce nearly one dollar and fifty cents' worth of guano per year, besides leaving their progeny to continue the service in future years. Since they produce this income without expense except for protection, the fowl may be conservatively appraised as having a value of $15 per pair; and though this may seem a fancy value for common cormorants, yet the commercial returns justify such an appraisal.

It was found that the deposits accumulated on the south island at the rate of about 4½ inches per year, or nearly 300 pounds per square yard. A few acres of such rookeries constitute a fortune indeed.

Two other species of cormorant are familiar residents of the coast. The black *cuervo de mar*, or "sea crow," is comparable in habit to our eastern American fish cormorants. They haunt the shores and the piers, whence they make short dives after fish, taking into their expansive throats even comparatively large fish. The nests are found on the rougher outlying rocks.

The *patillo*, or "little duck," is peculiar among the cormorants of the coast in living in isolated pairs, with homes on the cliffs or in the caverns; in constructing strong and heavy nests of seaweed, straw, or other accessible materials, and in having a high-pitched, cheeping note. It is sometimes known as the "chiquitoy," or "chuita," names probably referring to its voice, which is suggestive of a small song-bird.

It is a notable illustration of the adaptability of nature that three species of birds so closely related as these three Peruvian cormorants should in the same general environment manifest such striking contrasts in habit.

THE GRACEFUL PERUVIAN GANNET IS FOUND ON EVERY ISLAND

More pleasing to the eye than any cormorant is the common Peruvian gannet, the "piquero," or "camanay," with its snow-white head, neck, and breast and variegated back, its clean, elegant form, and swift, graceful flight. Everywhere present on the coast, it undoubtedly is the most abundant of the sea-fowl.

There is scarcely an island or a high point of shore but its steeper walls are dotted with nests of piqueros. Were it not for this habit of choosing for its nesting place the cliffs and more inaccessible places, the piquero would, perhaps, take first rank as a commercial bird. Doubtless in time, when the industry is better organized, practicable arrangements may be made for conserving a large proportion of the fertilizer which is now wasted from the abrupt cliffs. At the present time the piquero ranks third in commercial importance.

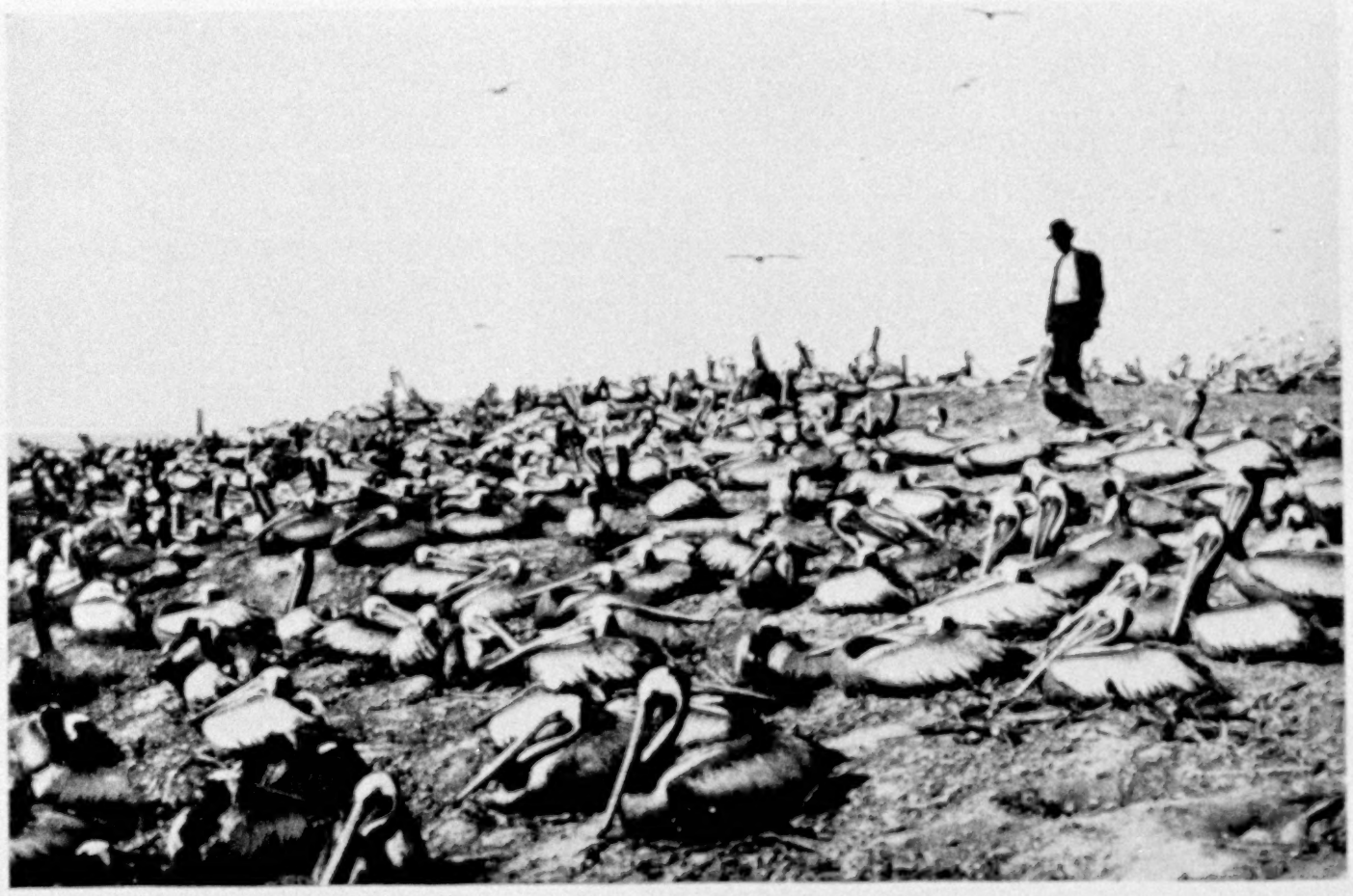
WHEN THE AIR "RAINED BIRDS"

It is always a striking sight when a single gannet, after circling over the water until its prey is seen, turns head down and falls precipitately into the sea, to disappear beneath the surface; but on one occasion the writer had a rare experience while passing from the Chincha Islands to the port of Pisco in a fisherman's rowboat.

An actual cloud of thousands of piqueros was seen flying over a large school of anchobetas. Suddenly, as if at a given signal, they began to fall into the water, hundreds at every moment, until within a few seconds practically the whole cloud had emptied itself into the ocean.

The air was almost clear of birds before the first had risen from their brief rest after emerging from beneath the surface. These were soon up again, and the repeated plunges then continued without interruption. Changing a little the course of our boat, we soon rowed directly through this downpour of birds.

One can scarcely imagine a more interesting or bewildering situation. The at-



A SMALL INDEPENDENT PELICAN ROOKERY ON ONE OF THE LOBOS DE AFUERA ISLANDS
The food of the pelican consists almost entirely of fish.

mosphere was actually cloudy with many thousands of fowls that were raining incessantly into the water; the whole surface of the sea was broken and spattering from the fall of animate drops and speckled with the glossy white of the reappearing birds, while the air was filled with the whirling of wings and the sounds of hundreds of splashes at every instant.

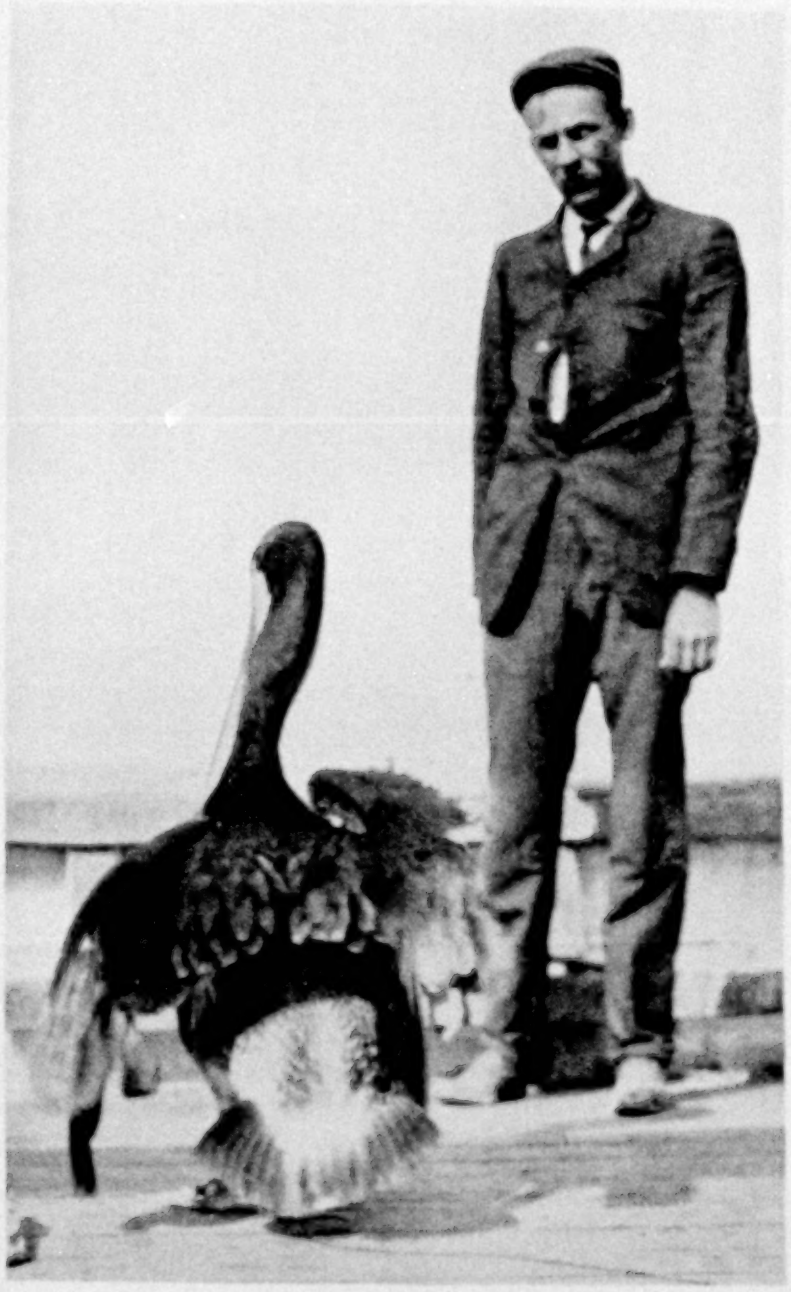
One of the accompanying illustrations (see page 546) shows a high cliff, at the Chincha Islands, dotted with nests. Almost universally the nests were found either upon cliffs or upon very steep and rugged slopes high above the water, where approach could be made only with considerable difficulty. Every day in the year one may find eggs and all stages of young at the nesting places, for the piquero has no favored season of breeding.

The naturalist and traveler, von Tschudi, who supposed this species to be the bird of chief importance, found that a single specimen would produce 3½ to 5 ounces of guano per day. Assuming that one ounce of this was deposited at the island each day (a low estimate), it is evident that a million piqueros would produce 356,000,000 ounces per year, or 11,400 tons—guano to the actual value of a half million dollars. Beyond question, the gannets of the Peruvian coast would far exceed a million in number, but in the present condition the product is practically all wasted.

THE HOMES OF THE PERUVIAN PELICANS HAVE BEEN DEVASTATED

Most conspicuous of all the birds of the Peruvian islands is the large pelican, or "alcatraz," which is seen along the entire coast. It was observed to be much more abundant in the north, but this probably was due not so much to climatic conditions as to the fact that the larger islands of the north afforded more congenial environment for nesting.

Residents of Pisco, and others whose connection with the guano industry has taken them into that region during past years, tell of the former great abundance of pelicans in the southern region, from the Chincha Islands to the Santa Rosa, in the Bay of Independencia. If such had been the condition, and many evidences supported the personal statements, a great change had occurred. Only a



BIZARRE AS THE ADULT PELICAN APPEARS, IT IS A GRACEFUL AND ELEGANT BIRD COMPARED WITH THE GROTESQUE NESTLING

At first naked and purple-skinned, then covered with white down, the nestling's awkwardness seems to increase with age. It attains a large size before developing its second plumage. Even when only slightly feathered, it may exceed its parents in stature and weight.

very few pelican nesting grounds could be found during the writer's visit.

The Chincha and Ballestas Islands were largely given over to the cormorants, San Gallan to the little petrel, and the Santa Rosas to small terns. Upon the Lobos Islands, however, the pelican was the bird of paramount importance. In March it was estimated that one rookery comprised upward of forty thousand pelicans nesting or rearing young and fully as many more of nestlings and flying birds in immature plumage. The eastward island of Lobos de Afuera, with its outlying islet to the north, contained close to, if not exceeding, one hundred thousand pelicans.

Such an array of pelicans makes a more showy effect than a vastly greater number of smaller birds.

Unfortunately, this great and valuable rookery, unmolested for several years, was not permitted to remain further undisturbed. Following the writer's visit the nesting grounds were invaded by extractors and were stripped of guano and nests. When the islands were revisited in December scarcely any birds were near the old rookery and only a couple of thousand nests were anywhere upon this island.

Upon the north point of the westward island the largest rookeries were found, including between twenty and forty thousand birds. Still other nesting grounds had become established upon the Lobos de Tierra Islands, thirty miles farther north, at a point on the island well removed from the scene of guano extraction.

It is one of the tragedies of the guano industry that this important bird has received so little proper consideration that its numbers are now greatly reduced.

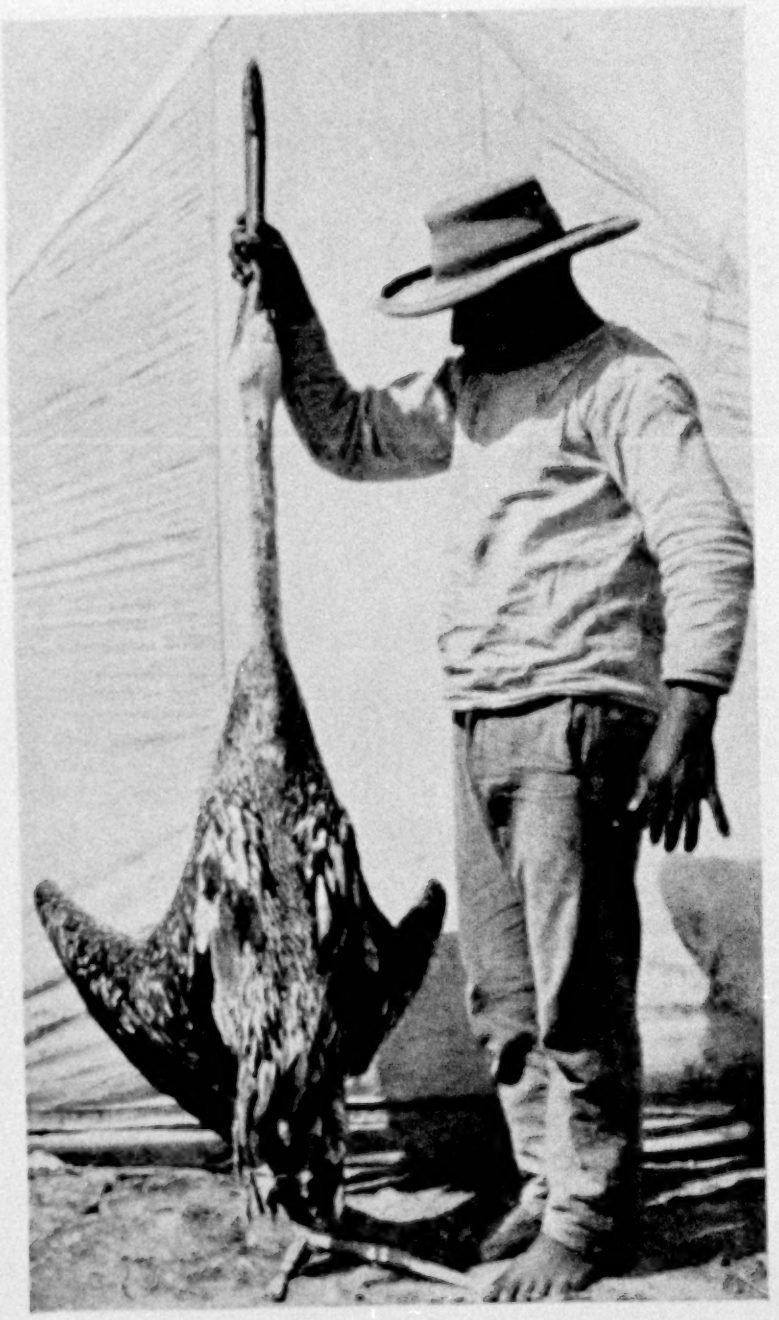
There exists a peculiar belief among many persons that the pelican is unaffected by disturbance, since the adults will often stand by their eggs or nestlings when molested. Every fact known regarding the movements, migration, and gradual extermination of the pelican confirms the belief that the species suffers more detriment from the molestation of its homes than perhaps any other bird found on the coast. The time may arrive when the pelican will have become so depleted as to be of comparatively slight significance.

The subordinate economic importance of the pelican relative to the guanay is told, not only by comparison of the numbers of birds of the two species, but also by analysis of the guanos. To some ex-

tent, however, and perhaps entirely, the inferiority of recent pelican guano is attributable to climatic conditions prevailing on the particular islands where the birds have found safe harbor.

As far north as the Lobos Islands, atmospheric humidity becomes appreciable and, indeed, light showers, though extremely rare, are not unknown. Fresh pelican guano from the Lobos de Afuera Islands gave, by analysis, more than 21 per cent of nitrogen, while random samples of dry guano from the surface of the rookery yielded less than 8½ per cent. Comparison of these analyses reveals the deleterious effect of atmospheric conditions in this locality.

Comparison of the last analysis with the guanay guano of the Ballestas Islands, with its 12 to 16 per cent of nitrogen, shows the inferiority of northern pelican guano to southern guanay guano, although this comparison tells no story of the relative merits of the birds when subjected to the same climatic conditions.



AN OLD PELICAN WHOSE PLUMAGE HAS BECOME ALMOST COMPLETELY GRAY

The bill in one species of pelican sometimes measures 18 inches in length. They are strong fliers, their wingspread often reaching ten feet. On the Peruvian coast both the adult birds and the nestlings are beset by parasites, which attach themselves by scores within the pouches.

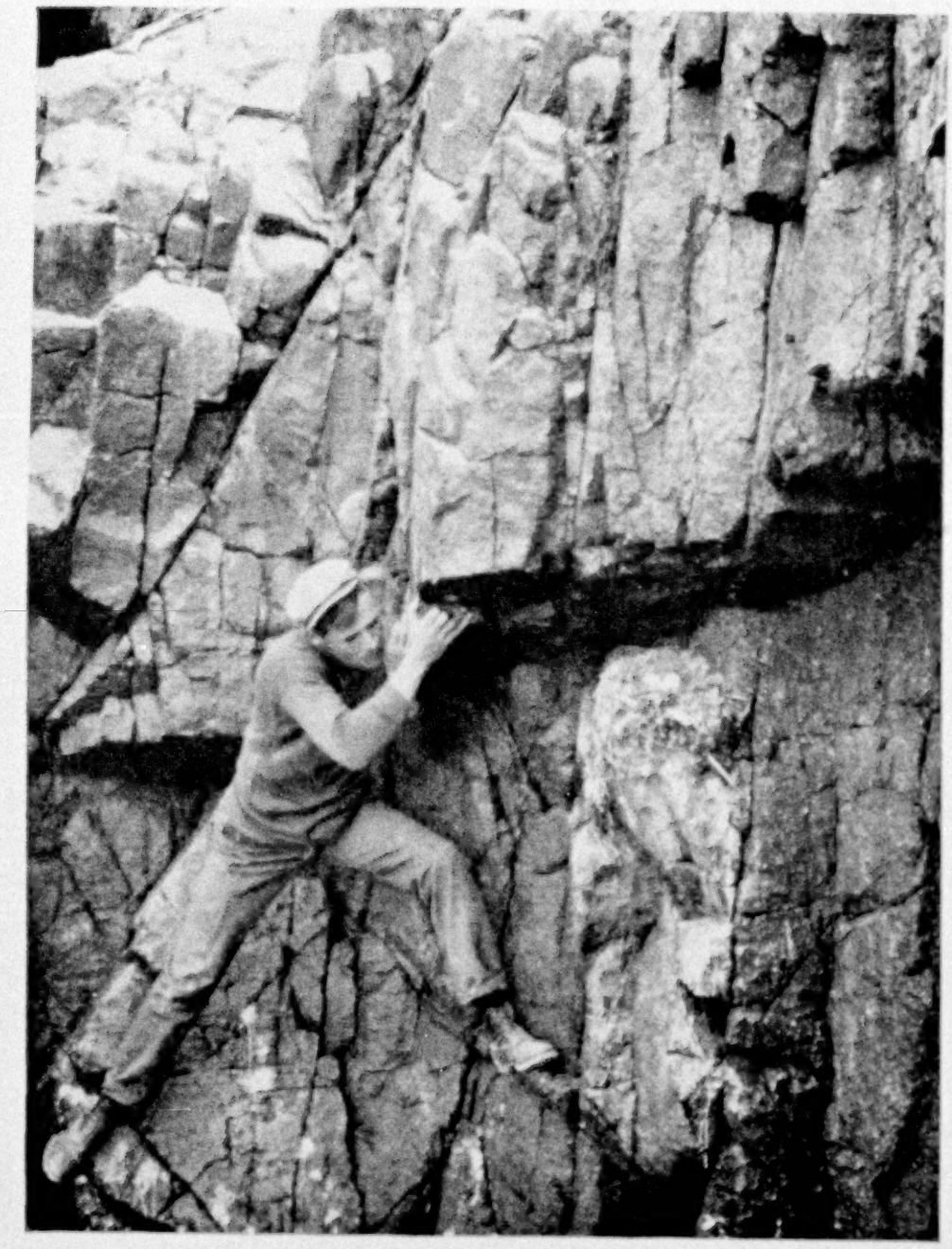
THE PELICAN YOUNG ARE NAKED AND AND PURPLE-SKINNED

Regardless of its economic rank, the pelican yields to no other bird of the Peruvian islands in interest to the observer or in the problems it presents for study.

When one first visits an island inhabited by great numbers of these large birds, the bewildering variety of color phases may well suggest the presence of several species. Longer acquaintance, however, shows that there is but one common Peruvian pelican, which at various ages and seasons displays itself in a diversity of dress. There are patterns corresponding to particular stages, and, since the periodic changes of costume take place somewhat gradually, there are various combinations of the several patterns.

It is interesting, too, to observe the young birds at various stages of growth. Bizarre as an adult pelican may appear alone, it loses by comparison all suggestion of grotesqueness when in company with its nestling young. At first naked and purple-skinned, then covered with white down, their awkward and uncouth appearance seems for a time only to increase with age.

Attaining a large size before developing their second plumage, they may even exceed their parents in stature and in weight while only slightly feathered. Great down-covered giants they then appear, while still requiring to be fed from mouth to mouth by their parents. The bill, though relatively short and nondescript in appearance, gives indication of its future style, and the expansive throat



A PERILOUS CLIMB TO REACH THE HOME OF A "PATILLO," A SPECIES OF CORMORANT WHICH BUILDS ITS NEST ON PRECIPITOUS CLIFFS OR IN CAVERNS

Unlike the white-breast cormorants, the patillos ("little ducks") live in isolated pairs. The nests are strong and heavy, being constructed of seaweed, straw, and other accessible materials.

is fully capable of engulfing the long beak of the parent to receive the food which the latter disgorges into the infantile interior, according to the well-known practice of the pelican and its relatives.

Both old and young are beset by parasites. The nesting grounds are made rather disagreeable by the large number of these that not only infest the birds, but swarm upon the ground and extend their explorations to the observer.

These insects attach themselves by scores within the pouches of the pelicans. In fact, the writer found that it was comparatively easy to rid himself completely of these pests by brushing them off as they passed the neck, for they never delay their steady march toward the supposed position of a bill. It is not surprising that the pelicans spend much time bathing and splashing in the water in any quiet cove along the shores of their islands.

THE STRANGE HABITS OF THE DIVING PETREL

Turning from the largest to the smallest of Peruvian guano birds, the little diving petrel commands attention. Though comparatively abundant, it is rarely seen.

No other marine bird has developed so effective a habit of retirement. By day, while one of the pair is brooding on a subterranean nest, the other is usually far out on the ocean, resting quietly or making short dives for prey beneath the surface.

On sea or land, there is scarcely a movement to attract attention to the bird. With the fall of darkness, all is different. From beneath the ground come the soft repeated calls, bewildering to an observer who is unacquainted with the cause. The air becomes filled with the sound of quick wings and gentle croaking voices, as little dark objects flit batlike back and forth.

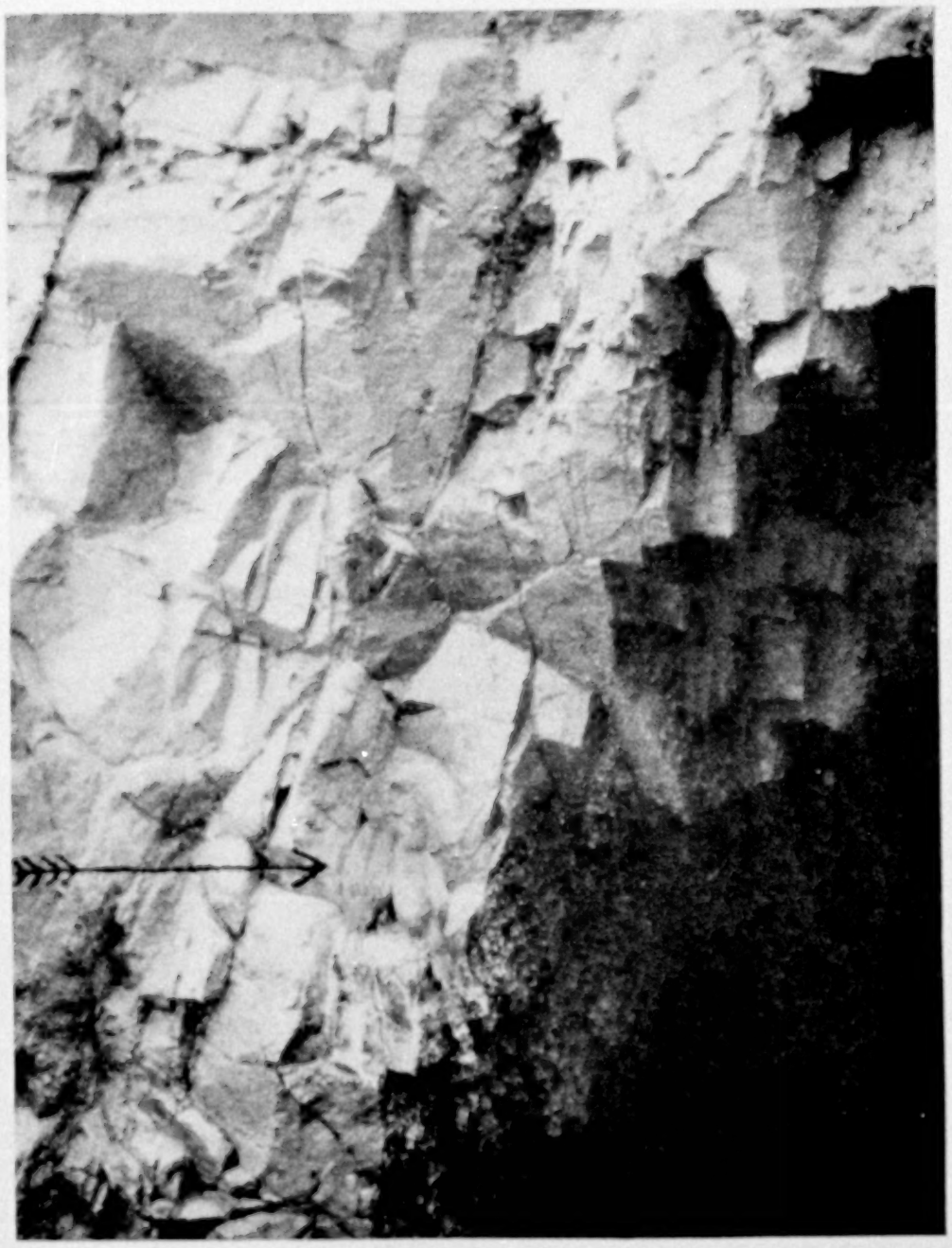
THE PETREL RESEMBLES A FEATHERED TERRAPIN

A ball of feathers emerges from an unnoticed opening in the ground, seems to roll rapidly a short distance, and then

rises in flight direct for the sea; another, coming from the ocean, disappears mysteriously into the ground to replace a complaining mate.

When taken from the burrows, the little bird is found to measure ten inches in length and to weigh half a pound. The general color is black above and white below, while beneath the feathers is found a thick, gray down. The dense coat gives an appearance of large size to the body, while the little wings and short, stout neck seem disproportionately small appendages. When its body is flattened out on the ground, this diving petrel strangely suggests a feathered terrapin.

Off the Peninsula of Paracas, near Pisco and just across the "Narrows," is the lofty San Gallan, marked by several peaks that reach an altitude of 1,200 to 1,400 feet. The tops of these hills are more or less concealed by clouds, which serve as Nature's weather signals to the local mariner. "When San Gallan puts on its cap" of heavy clouds, the prudent sailor avoids the Narrows and delays his southward trip. Here was the preëminent home of these diving petrels, or "potoyuncos," as the Peruvians euphoniously call them. From the lower desert slopes of San Gallan's hills to the verdant cloud-bathed peaks, everywhere were large patches of ground undermined by short burrows.

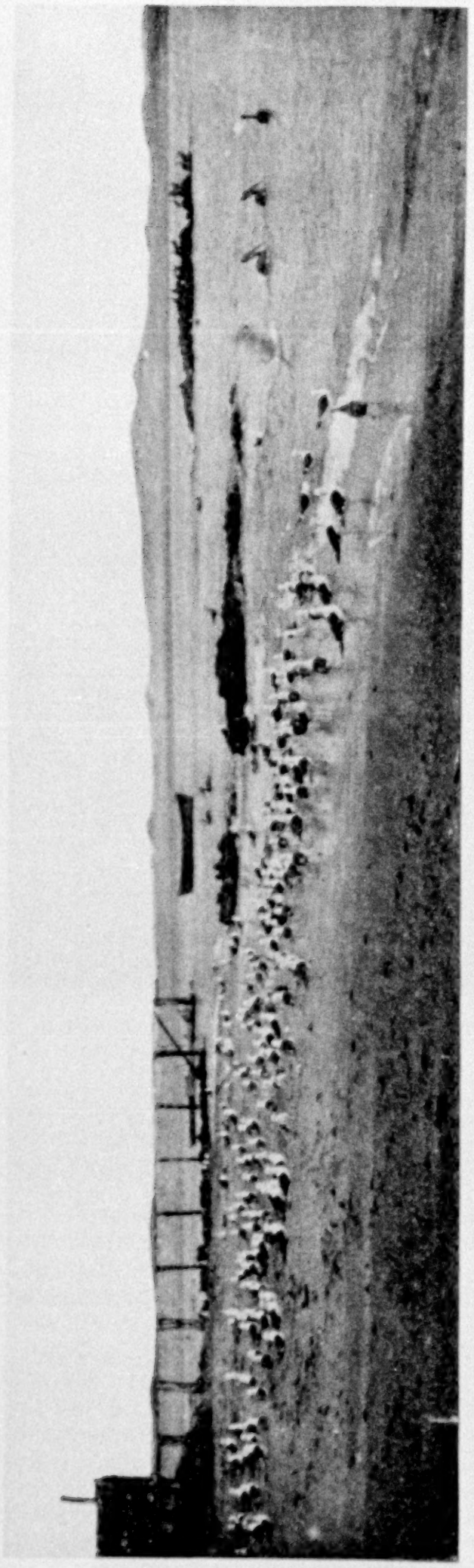


THE YOUNG PATILLOS IN IMMATURE PLUMAGE ARE WELL CONCEALED AGAINST THE GRAY BACKGROUND OF THE ROCKS

Because of its high-pitched, cheeping note, this species of cormorant is sometimes called "chiquitoy," or "chuita," suggesting a songbird.

Small as the "potoyunco" is, the guano from its nests is valued for its high quality. Unfortunately, the meat is likewise esteemed by the native fishermen and laborers, and the array of discarded wings strewn about many of their nesting places reveals the occurrence of ruthless depredations. Unless effective measures be taken to prevent, the potoyunco will gradually but surely incur the fate of the penguin and other birds whose habits and defenselessness lay them open to destruction.

A tropical penguin may seem another Peruvian paradox. Nevertheless, penguins are quite common on the coast of



THE BEACH-CLEANING BRIGADE OF THE PERUVIAN RAINLESS COAST: SCAVENGER SEA-GULLS

Peru, occurring even as far north as the Lobos de Afuera Islands, which are within a few hundred miles of the Equator. This, of course, is because the ocean off Peru is not tropical, but is constantly chilled by waters that stream from Antarctic regions to the Equator.

Penguins are naturally more numerous toward the south. Almost every cavern beneath the Chincha and Ballestas Islands reveals its quota of nests. The largest number of penguins seen at one time was grouped upon a beach of the Isla Vieja, in the Bay of Independencia, a little more than 14 degrees south. They were about sixty in number, a few of them showing plumage of an immature stage.

The Peruvians have given penguins the suggestive name of "*pajaro niños*," or "baby birds," in reference to their infantile, waddling gait when walking with the reduced wings held stiffly from the body like the helpless arms of an infant.

The guano of penguins is limited in quantity and liable to be moistened by the spray from the waves dashing into the caverns they prefer to frequent. Nevertheless, when obtainable in good preservation, it is highly esteemed.

Penguins are also valued for the oil, and the fishermen seek them for their skins, while sailors kill them "for fun." Close, hairlike feathering makes the skins adapted for the fashioning of "fur" caps.

BIRDS OF DIFFERENT FEATHERS THAT FLOCK TOGETHER

There are many other interesting birds of the Peruvian islands. Petulant blue Inca terns, with white curled "moustache," dart excitedly into your very face almost, but nest prudently in the rougher places, where the homes may be protected under shelving portions of guano or in rudimentary burrows.

Pearly gray terns practically cover the south Santa Rosa Island with nests which are so indistinguishable amidst the gravel and guano that one unavoidably crushes the eggs in walking about; the nestling birds, however, are never trampled, for they are too quick and clever at concealment.

Noisy gulls of several species nest scatteringly on various islands. Shore birds, such as curlews, oyster birds,

plovers, and sandpipers, frequent the margins of the islands, especially where sandy beaches are available.

Scavenger buzzards, or "gallinazos," profiting by the experience of other birds, upon whose eggs and young they love to prey, conceal their own nests in caverns or beneath overhanging rocks.

Large condors are occasionally seen posing silently on some high hillside, and a lonely species of perching bird, the little "chirote," also has found its way from Andean slopes to the barren sea islands, where it flies back and forth from cliff to beach or runs along the water's edge in search of tiny prey.

Sailing from island to island or back and forth from mainland to island, one may meet typical birds of the high seas: dull-colored shearwaters, little petrels that hover over the waves or seem to dance upon the surface of the sea, and, more conspicuous than these, the beautiful Peruvian albatross. The last, though smaller than the great southern albatross,—its body, indeed, scarcely larger than that of a gull—has yet a wing expanse of eight feet.

ALL THE GUANO ISLANDS LIE NEAR THE MAINLAND

To mention the places where guano deposits have been found would be almost to list the islands, islets, and points of shore from near Paita, at 5 degrees south, to the southernmost limit of present Peruvian territory, at 18 degrees south—a distance corresponding to that between New York and Cuba, or about 1,300 miles.

The commercial guano situations comprise some hundreds of points, but chief among these, for their historical importance, are the Chincha and Ballestas Islands, the islands of Guañape and Macabi, and the larger Lobos Islands of the two groups, de Afuera and de Tierra. Pabellon de Pica, now beyond the territory of Peru, was also an important point at an earlier time. Among places of second importance are the Islas Santa, Fronton, Palominos, Asia, Santa Rosa, Vieja, and Cerro Azul.

From year to year the scene of the industry may shift from island to island, as the deposits accumulate or become exhausted, but the Chincha and Ballestas and the Lobos Islands are rarely abandoned for a complete twelve months.

None of the islands are very large or far removed from the coast. The nearest islet is so close to the main shore as to be reached conveniently by an aërial trolley, while most of the islands are not more than ten or twelve miles removed. The only group at all remote is the Lobos de Afuera, which is about 33 nautical miles from the nearest point of mainland. The largest island is that of Lobos de Tierra, with its length of nearly six miles and a width varying from one-sixth of a mile to two miles.

The Lobos de Afuera Islands, combined, are slightly smaller, while each of the two larger Chincha Islands will not average a half mile in diameter. The south and smallest island of the latter group, and recently the most important, has an extent of less than 30 acres, and on the occasion of the writer's visits the greater part of its surface was carpeted with the nests of guanays.

The islands of Ballestas, a sister group of the Chinchas, and, like it, composed of three principal units, are each approximately equal to the smallest of the Chinchas. They are bolder and higher and must be gained by climbing from the water, being without beaches except at the bases of unscalable cliffs. These islands of Ballestas are from one to three hundred feet in height.

PRACTICALLY NO VEGETATION ON MOST OF THE ISLANDS

All of the islands are more or less bold, rocky, and barren. Generally, vegetation is entirely absent, except where the higher points reach such an altitude (about 1,200 feet) as to derive moisture from the clouds. The higher peaks of desert islands may therefore support luxuriant, but entirely isolated, gardens of vegetation. These are found only upon such lofty islands as San Gallan, La Isla Vieja, or San Lorenzo.

A small amount of vegetation was seen on the sandy shores of Lobos de Tierra, but this was exceptional. Even if the want of atmospheric or soil moisture did not exclude the possibility of plant growth, the rocky nature of the ground and the general presence of too strongly concentrated fertilizer would render con-

DIGGING AND SACKING RECENT GUANO

The tropical sun bakes the guano into a hard, dry crust, and the fresh, dry breezes seldom carry a trace of odor. Where the material is comparatively recent, the only implements required are picks, shovels, a screen, and a supply of sacks.

ditions generally unfavorable for vegetation.

Naturally the only native land-dwelling inhabitants of such islands, besides the birds and sea lions, are parasitic insects and their enemies—the spiders, scorpions, lizards, and bats—except that on the green-capped peaks colonies of land snails have been introduced, perhaps by the condors, which visit back and forth from mainland to island.

Escaped cats live freely on at least one of the islands, sustaining themselves, no doubt, upon the birds and the shellfish that are easily found upon the exposed rocks between tides. Evidently fresh water is not essential for feline health and prosperity.

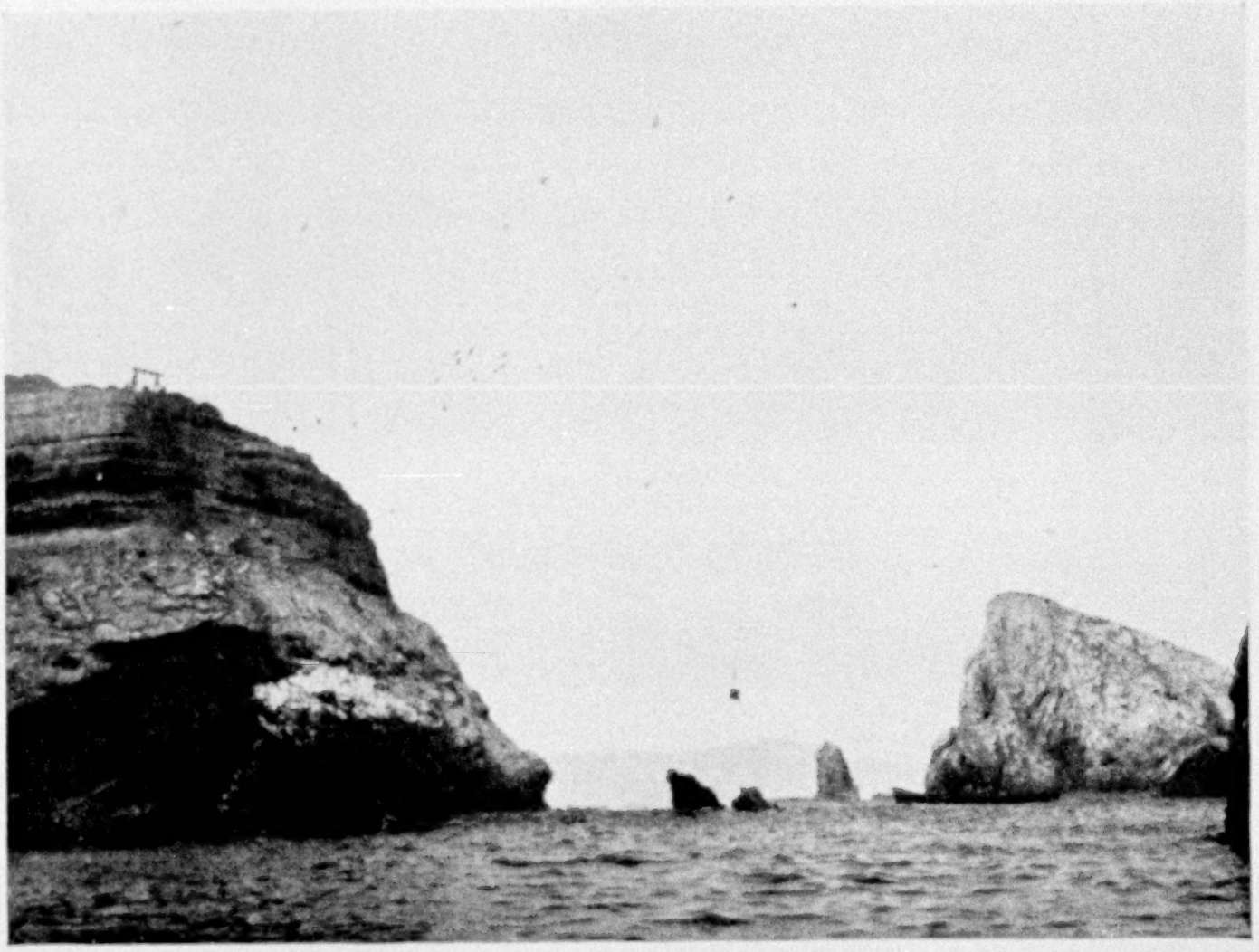
There is a distinct difference in the atmospheric conditions of the islands of the north and the south. Nearer the Equator the sea breeze becomes somewhat warmer, and probably in exceptional years the course of the Peruvian Current swings westward a little sooner, permitting the warm equatorial waters to flow southward to the Lobos Islands.

Light rains are not unknown on Lobos de Tierra, and this undoubtedly accounts for the presence of small patches of vegetation and the inferior quality of the mineral guano. The typical conditions of the coast apply fully in the Chincha region, and it is doubtful if a shower has ever fallen upon these islands.

MANY ISLANDS DIFFICULT OF ASCENT

Contrary to expectation, life upon these arid islands has few unpleasant features and a wealth of compensatory interests. Some of the shores are bold and difficult of access, but everywhere that work has been pursued some practicable method of access has been devised.

One may have to make the landing from a small boat, skillfully handled in a plunging surf, by an opportune leap to a bare foothold on the ragged shore rocks. At another island one must take the chance to grasp the lower end of a rope ladder which dangles from an improvised pier hanging out from the side of the island. In other places a smooth cove and an easy beach are at hand.



GUANO BEING CONVEYED FROM MIDDLE ISLAND OF THE BALLESTAS BY AN AËRIAL TROLLEY

The trolley is simple in construction, consisting of two stout wire cables suspended from a frame (see illustration on preceding page) at the top of the island and running to a convenient rock near the shore. A lighter is rowed to a point beneath the lower end of the cables to receive the guano, which is lowered by means of pulleys and windlass.

Some small islands are inaccessible in very rough weather, and the writer has passed entirely around islets that rose out of the surf like big chimneys, with sheer walls of some hundreds of feet, without finding a single place of access by available means. One of these apparently had never been scaled; but, if its small table top contains a few hundred tons of the valuable guano, the eager and intrepid workers will find a means of ascending its walls, and, this once done, the embarkation of the guano will present no extraordinary difficulty.

Once on the islands, the guano is found to be baked into a hard, dry crust under the tropical sun, and the fresh, dry breeze rarely carries the trace of an odor.

Unless one is enslaved to the fresh-water bath and other "comforts of civilization," a camping experience upon any one of the Peruvian islands is never to be regretted. The dependable breeze keeps the air fresh and sweet. By day there are hills to climb, cliffs to descend, and perhaps caverns to explore; there are fish to capture, and the bird-life to study is always too varied for the attention to weary. The night brings its own peculiar charms. Let us cite a particular instance.

A NIGHT SCENE

Lodged upon the side of the North Ballestas Island about 100 feet above the water, the open front of our tent looked directly down upon the silvery glaze of the rising moon, showing broadly and brilliantly on the sea for many miles. Yet there was no stillness to the night.

About us and beneath us were the varied sounds of the surf, roaring against

HEAPING SCREENED GUANO FOR TRANSFER TO THE MAINLAND

the rocky shore, the peculiar resounding crash of a great swell breaking on a bit of shingle beach of the island just opposite, or the fierce boom of a wave that ended a thundering course through a long cavern deep into the heart of the island beneath us.

A short distance away the other, loftier islands of the group were outlined against the sky, while the light of guano camps shone from the tops or from some scant perch on the precipitous sides. The situation was picturesque enough, and measurably isolated, but the dim beacon light of Pisco, ten miles away, and the Danish vessel, rolling near by, gave a sense of contact with the rest of the world.

With the peons engaged in extracting guano it was, perhaps, another story. The camps of the workers were simple indeed. Skeleton frames of wood with covering and walls of burlap or old guano sacks constituted the barracks. They seemed adequate, however, for the climatic conditions.

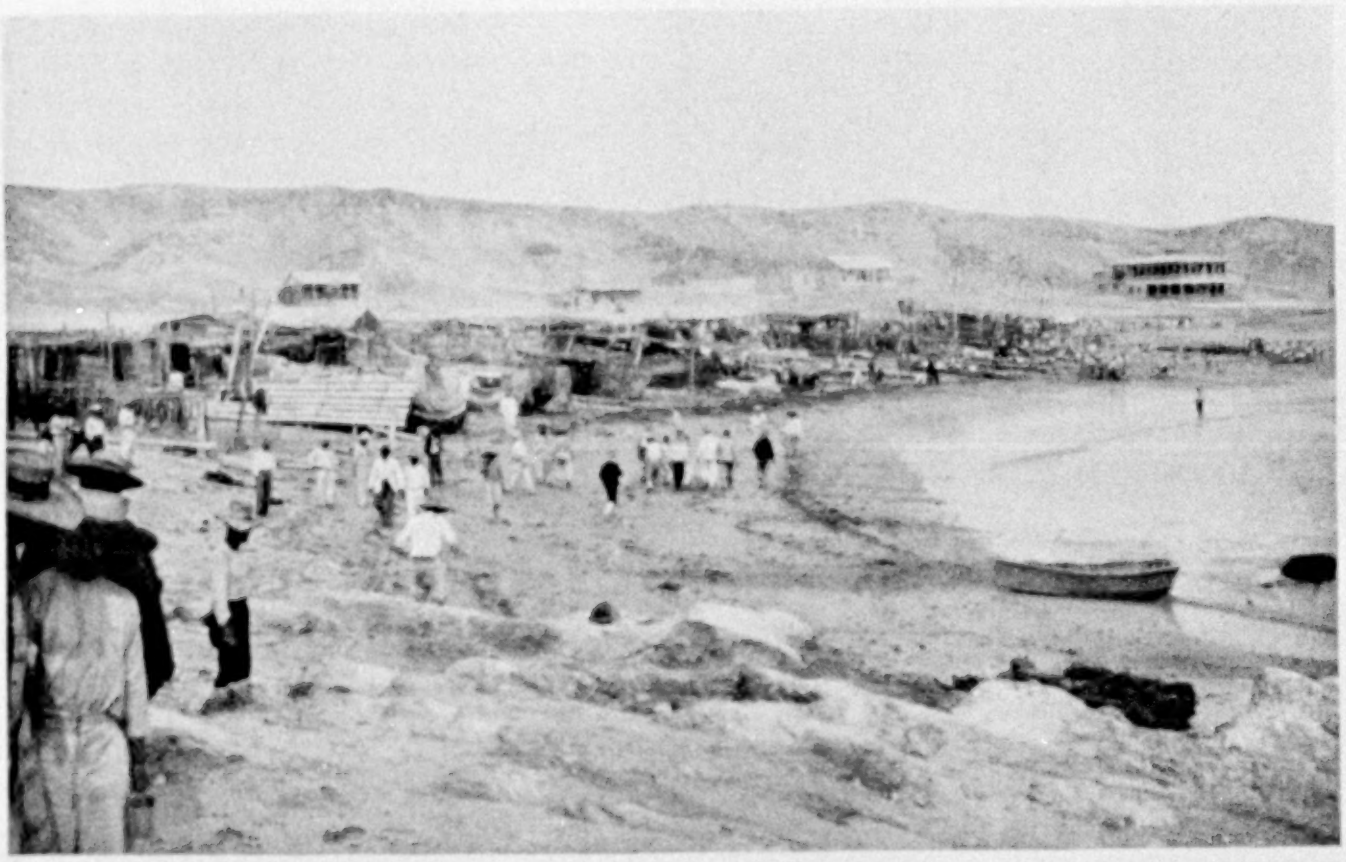
The foreman's camp was often only a somewhat larger tent of the same construction, though the exporting company usually made some better provision for an officer.

The workers were practically all Peruvians of the ancient stock, and many of them came down from the mountains to engage in this work. Often there were few in the camp who could speak Spanish and the foreman could communicate with the employees only by signs or through an interpreter.

THE GATHERING OF GUANO IS A SIMPLE PROCESS

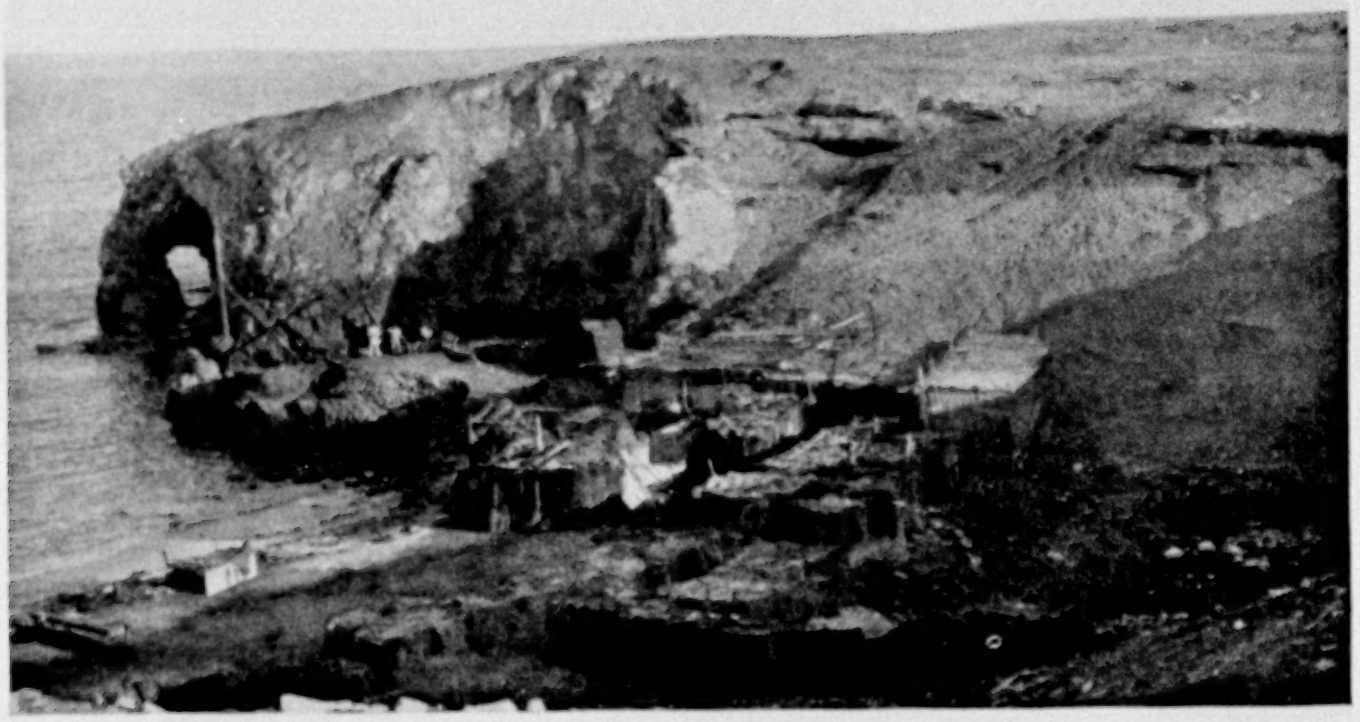
The extraction of guano, as observed, was a very simple process. Where the material was comparatively recent, the only implements required were the pick and the shovel, a screen, and a few sacks. The surface cake was first broken up and thrown into small heaps. Where several contractors had a concession from the government covering the same island, there was much rivalry in getting the best guano mounded, for this was the only recognized method of establishing a claim to a particular field.

The guano was subsequently pitched through slanting wire screens to remove the gravel, and then sacked for embarkation by *lanchas*, which are strongly constructed lighters in the form of rowboats, adapted for use in the heavy swell liable to prevail about the islands.



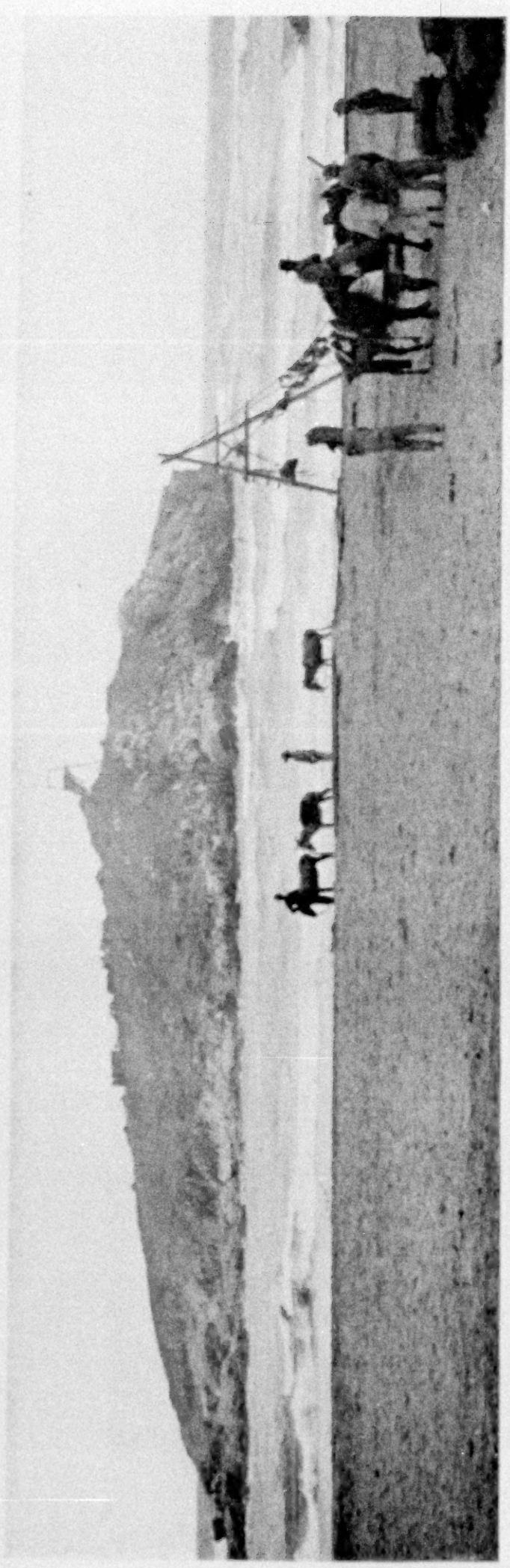
A CAMP OF FISHERMEN AND GUANO-GATHERERS: LOBOS DE TIERRA

The large house in right background is the office and residence of an American firm, contractor for the Peruvian Corporation. The smaller houses are offices for minor officials.



A DESERTED CAMP OF GUANO-WORKERS: CHINCHA ISLANDS

The workers in the guano deposits are practically all Peruvians of the ancient stock. Their camps are extremely simple, the huts consisting of skeleton frames of wood covered with burlap or old guano sacks.



A SMALL ISLAND NEAR CERRO AZUL, WHERE AN INFERIOR GUANO OF SEA LIONS MIXED WITH BIRD GUANO IS GATHERED

Here the guano is conveyed from island to mainland by aerial trolley (see illustration on page 561), then loaded on burros for conveyance to the plantations in the Peruvian interior.

A very common method of conveying the guano to the lighter was by means of the *andarivel*, an aërial trolley, consisting of two stout wire cables suspended between a frame at the top of the island and some convenient rock somewhat removed from the shore.

The boat would be rowed beneath the lower part of the cable to receive the guano, lowered by pulleys and windlass. Both ends of the line being attached to traveling pulleys, the sacks of guano, descending by gravity, drew the empty sacks back. No power was applied to the windlass except to prevent the too-rapid descent of the guano.

When the lancha was loaded it was rowed out to the vessel, where the sacks were hoisted into the hold.

HALF-HOUR SHIFTS FOR WORKMEN LOADING GUANO SHIPS

The stowing of the guano was the one phase of the work which put a severe test upon human endurance. If the guano was particularly strong, the foreign crews could not be utilized for the task. Native laborers were then relied upon, and even these could remain in the ship's hold for only half an hour or an hour at a time.

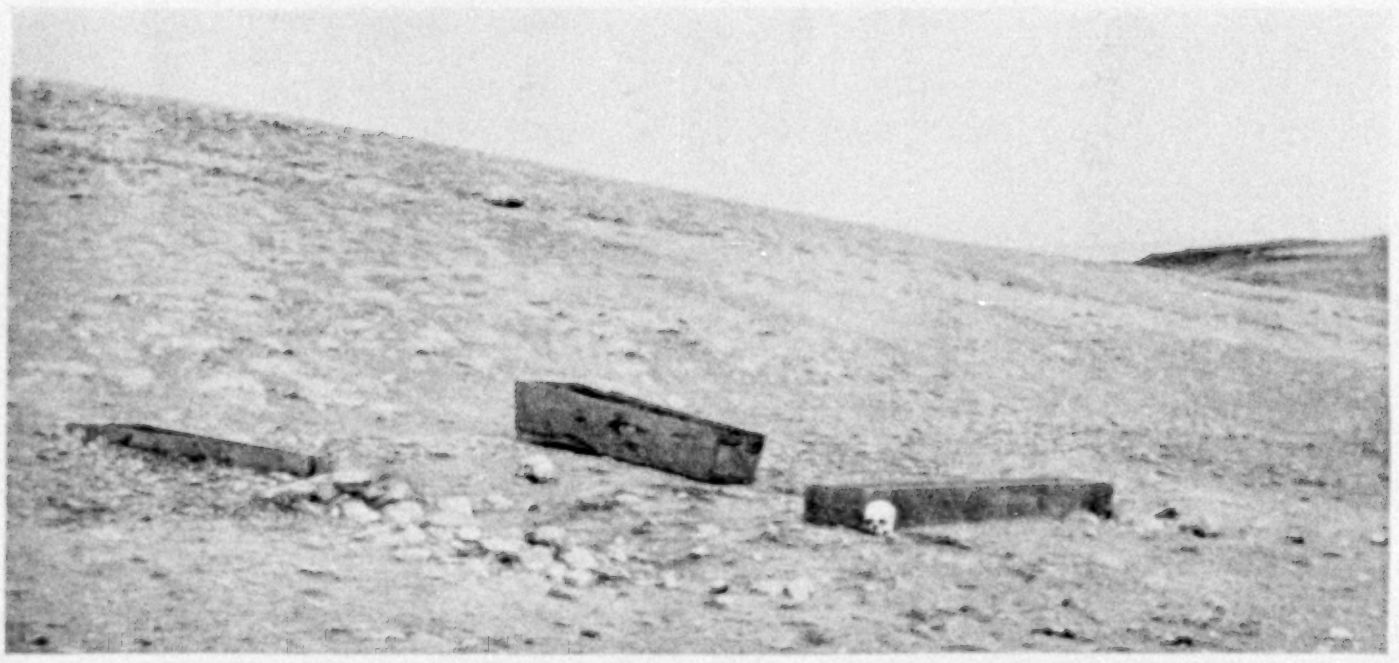
A much more extensive equipment was employed on the larger islands of the north. An American company, contracting for the Peruvian exporters, had laid lines of track for conveying the guano by tram-cars, and the screening was done from trestles over a lower-level track. A bridge of some length had even been constructed between the main Lobos de Tierra Island and a smaller island near by.

One could see upon this island several permanent buildings, besides the usual laborers' and fishermen's camps. The largest of these contained the offices and

XUM

MANY OF THESE HILLS OF THE LOBOS DE AFUERA ISLANDS WERE COVERED WITH GUANO AT ONE TIME

All of the guano islands are more or less bold, rocky, and barren in appearance. They are without vegetation because of the lack of moisture. Only on the higher peaks, which derive some moisture from the clouds, are there occasional patches of luxuriant green.



SOMETIMES LABORERS DYING ON THE ISLANDS ARE BURIED IN OLD GUANO

Subsequent excavations bring the coffins to the surface. Some of the bodies are almost perfectly mummified, as a result of the dry atmosphere and the effect of the guano.

store of the company, while two smaller buildings housed the representatives of the government and the exporting corporation respectively.

By far the greatest portion of the guano that has been exported consisted of the ancient deposits, called "mineral" guano, which in places covered the islands to great depths. This has been simply stripped away until scarcely any of the old guano remains except some of the lowest grades that scarcely justify exportation.

It is an interesting fact that many deposits were found deeply buried beneath layers of sand and broken rock, and such beds have led some to suppose that the guano could not be of animal origin. The blowing sand and falling rocks from the weathering hills would readily explain the covering of old beds.

MILLIONS OF TONS OF GUANO LOST

When one watches the present accumulation of guano at the rate of more than four inches per year in some places, or at the probable rate of twenty to thirty thousand tons per year along the entire coast, the wonder is, not that the great beds should have accumulated, but that so few millions of tons should have been found. In past times, undoubtedly, great losses must have occurred from the falling of cliffs undermined by the surf, from the breaking up of the islands by the slow, wearing action of the waves, and perhaps from slight subsidence due to seismic disturbances.

It is within the bounds of possibility that additional deposits, buried beneath the surface, may yet be located. Unless this be the case, the industry is permanently reduced to the annual deposits, which scarcely exceed the demands of Peruvian agriculture in its present condition, without providing for the great future developments in land cultivation in that country that must follow sooner or later with the adoption of more elaborate systems of irrigation.

Since the important birds have been greatly reduced in numbers, it is reasonable to expect a substantial increase under natural conditions, if interference with the breeding be reduced to the minimum consistent with the utilization of the deposits. The future of Peruvian agriculture and industrial life seems rather closely linked with the protection of the guano birds.

It is a fortunate thing to have such an appealing commercial reason for the fostering of the birds. Government, mortgagees, and agriculturists must sooner or later combine effectively to obstruct the extermination of these resources and to promote an increase to the maximum number of birds permitted by Nature.

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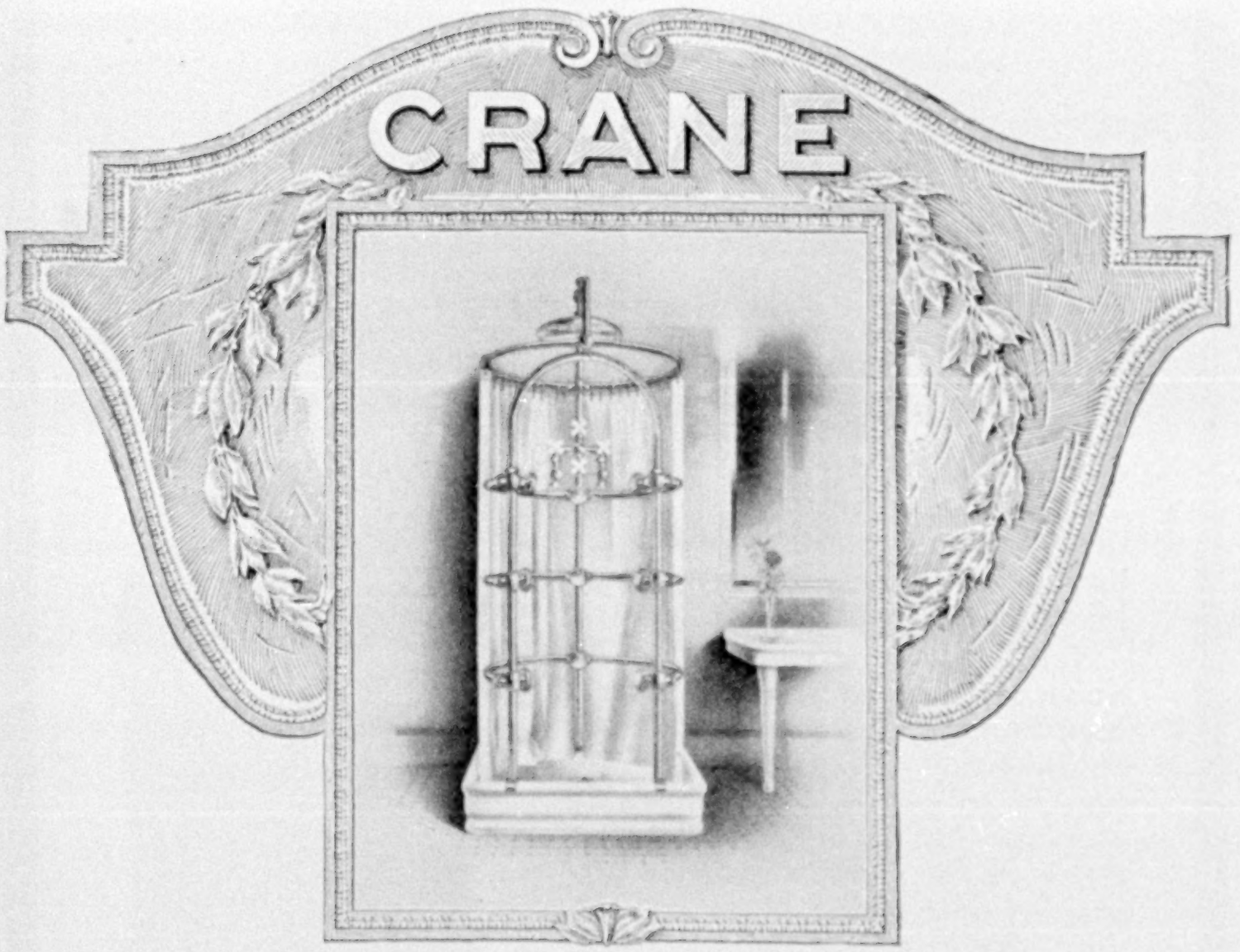

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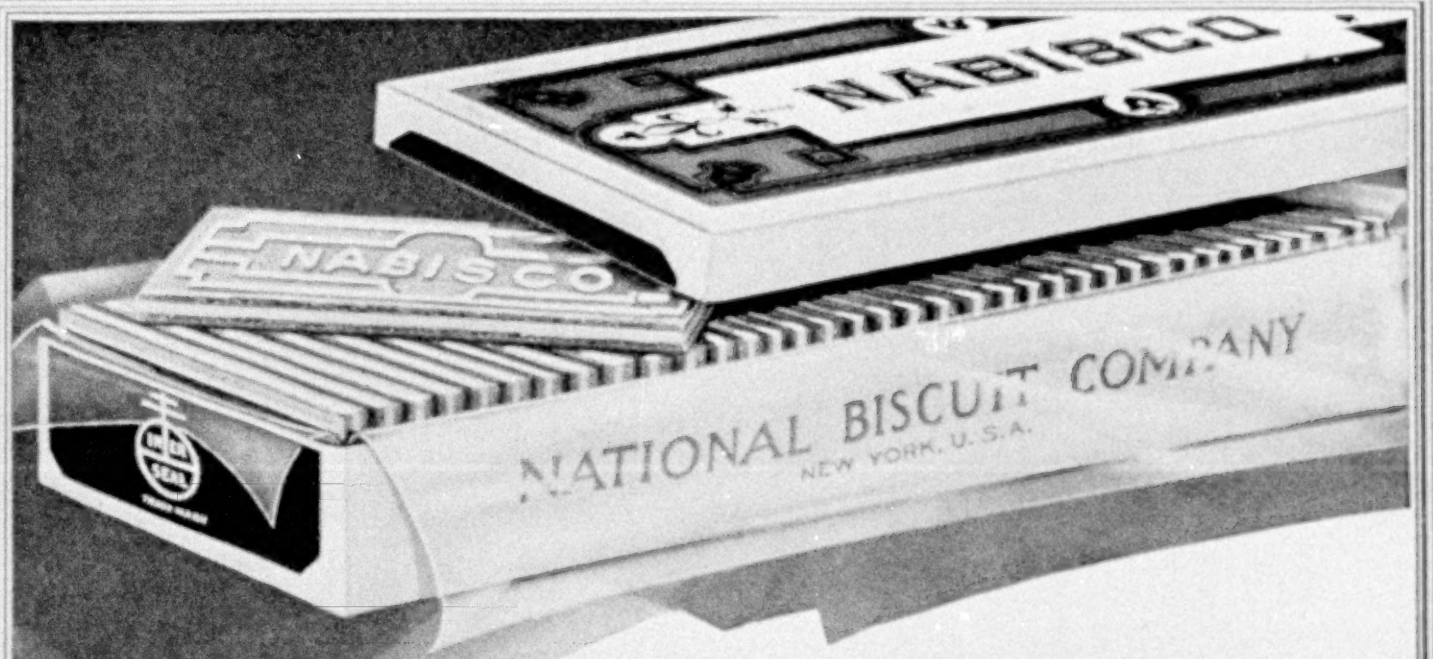

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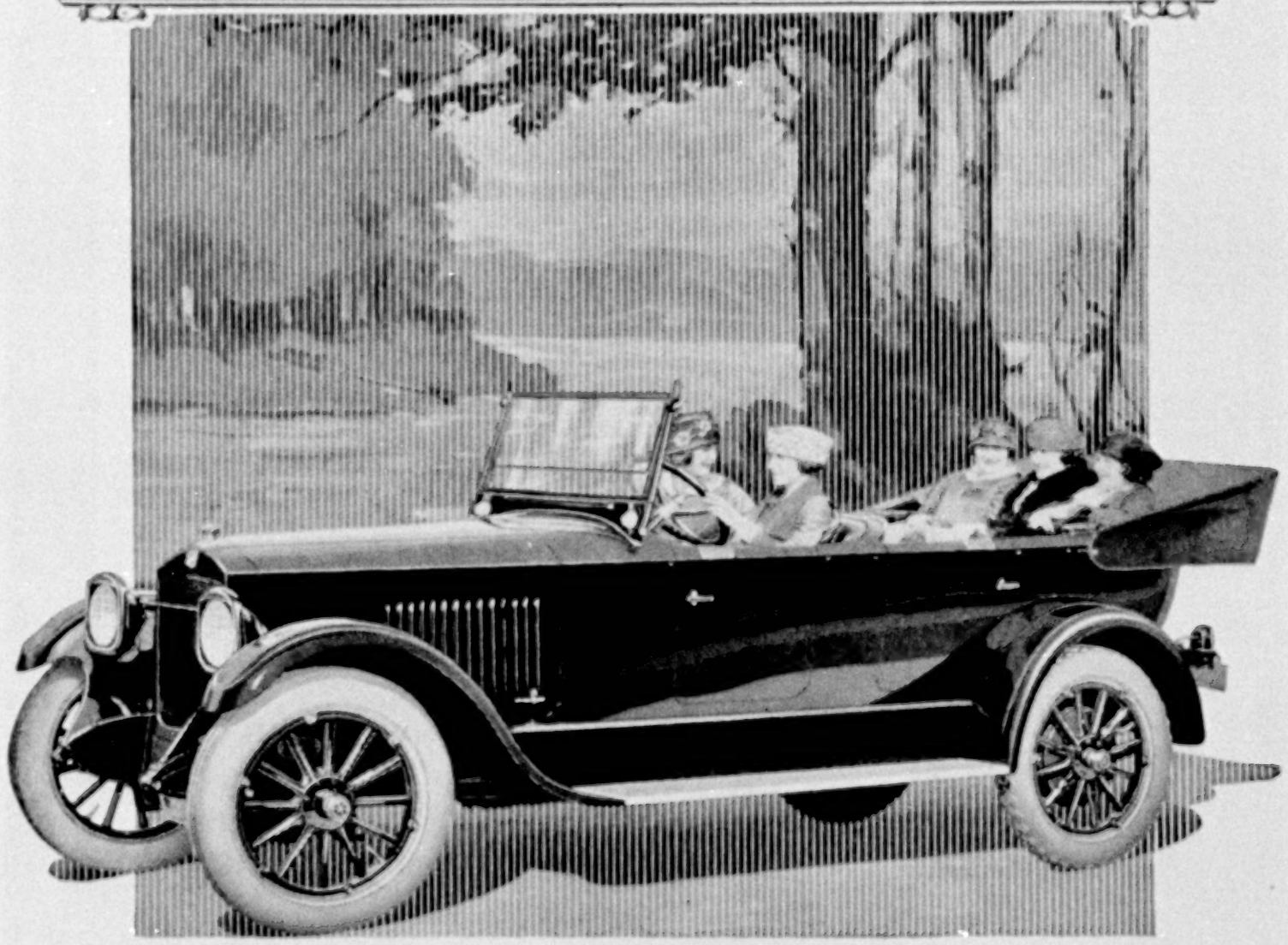

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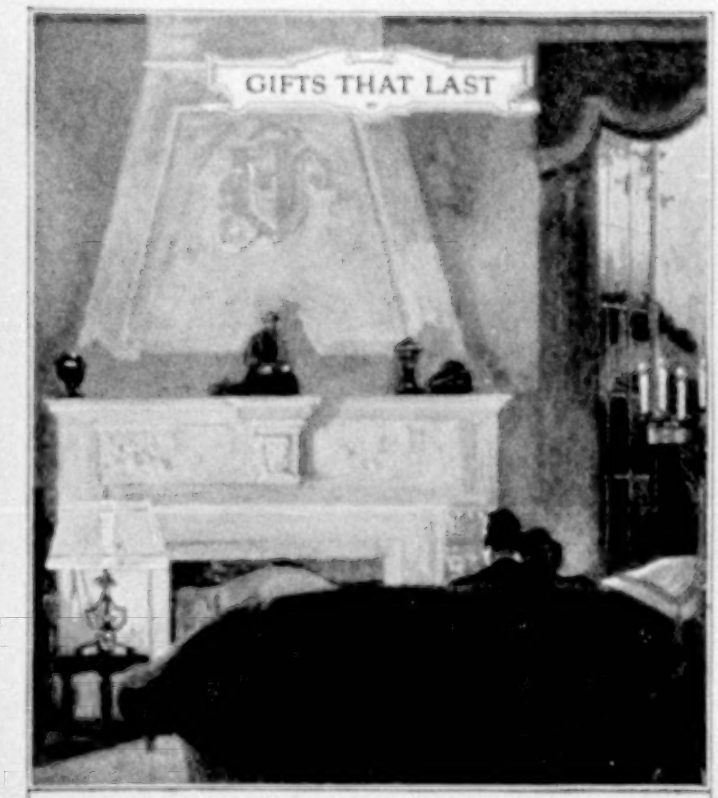

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A new discovery makes this method possible. Pepsin must be activated, and the usual agent is an acid harmful to the teeth. But science has found a harmless activating method. Now active pepsin can be constantly applied, and forced into every hiding place of film.

Send the coupon for a 10-Day Tube. Note how clean the teeth feel after using. Mark the absence of the viscous film. See how the teeth whiten as the fixed film disappears.

Look at your teeth now, then look in ten days. Let your own teeth decide between the old ways and the new. This is important. Cut out the coupon so you won't forget.

Pepsodent
REG. U.S. PAT. OFF.

The New-Day Dentifrice

A scientific film combatant, now advised by leading dentists everywhere. Druggists supply the large tubes.

384

Ten-day tube free

THE PEPSODENT COMPANY,
Dept. 496, 1104 S. Wabash Ave., Chicago, Ill.

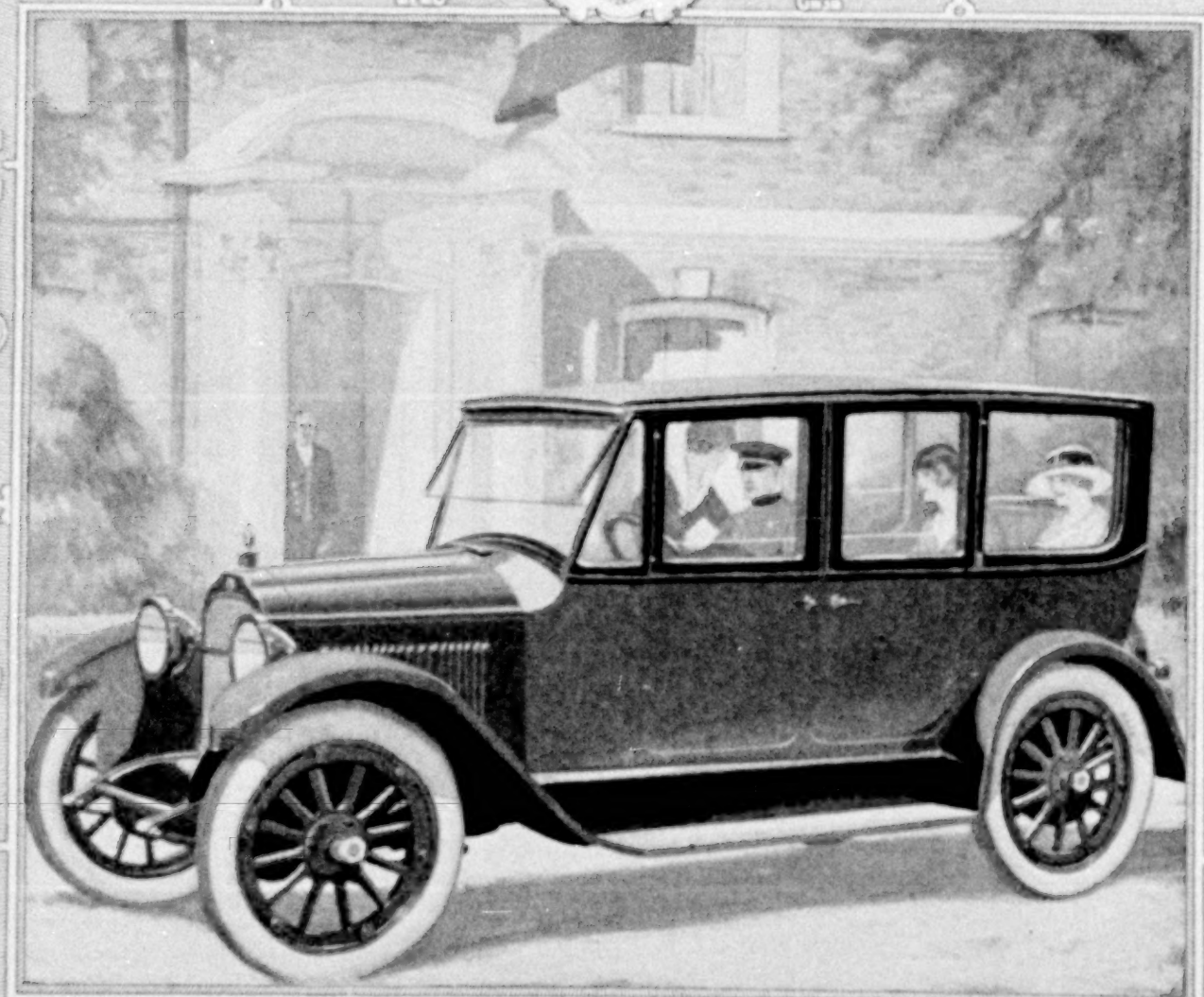
Mail 10-Day Tube of Pepsodent to

.....

.....

.....

Only one tube to a family



Entrance Belgian Embassy, Washington, D. C.

WILLYS-KNIGHT

OWNERS who have driven this car for long periods, over great distances, and under all conditions of travel, find that its power is increased and it runs even more quietly after miles of use. They declare the *only* change in the Willys-Knight Sleeve-Valve motor is *improvement with use.*

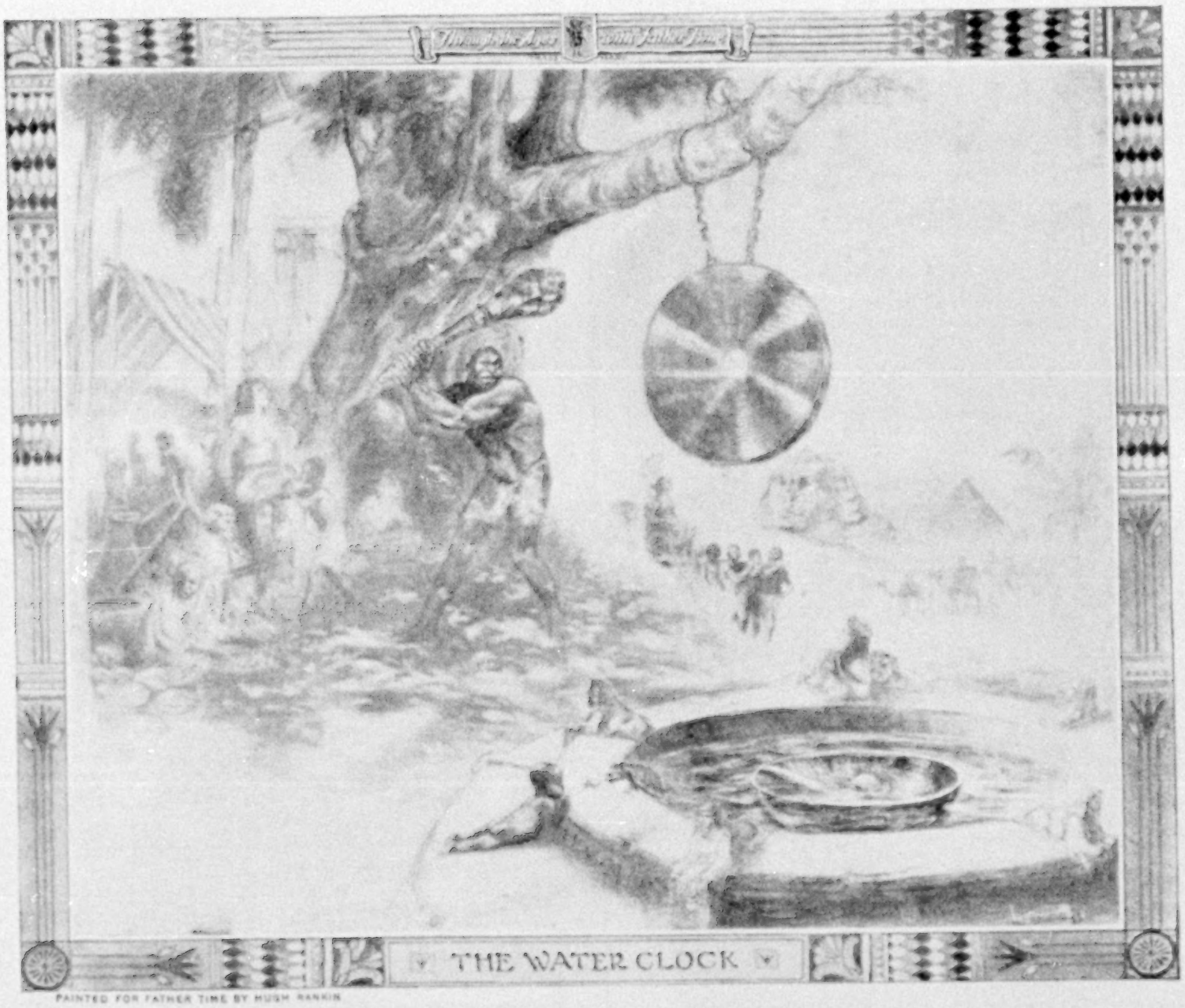
They find a source of steadily growing satisfaction in its daily consistency of performance, and the realization that its sleeve-valves need no adjustment.

From this accumulated experience of owners, *you* can judge what the Willys-Knight car will mean to you.

Willys-Knight Booklet on Request

WILLYS-OVERLAND, INC., *Toledo, Ohio*

WILLYS-OVERLAND, LIMITED, *Toronto, Canada*



PAINTED FOR FATHER TIME BY HUGH RANKIN

A massive brass bowl slowly sinking in the fountain—a watchful slave to strike the hour—

Such was the Water Clock of ancient Egypt.

The Orient uses it to this day, and China claims its invention by Hwangti in 2,636 B. C.!

* * *

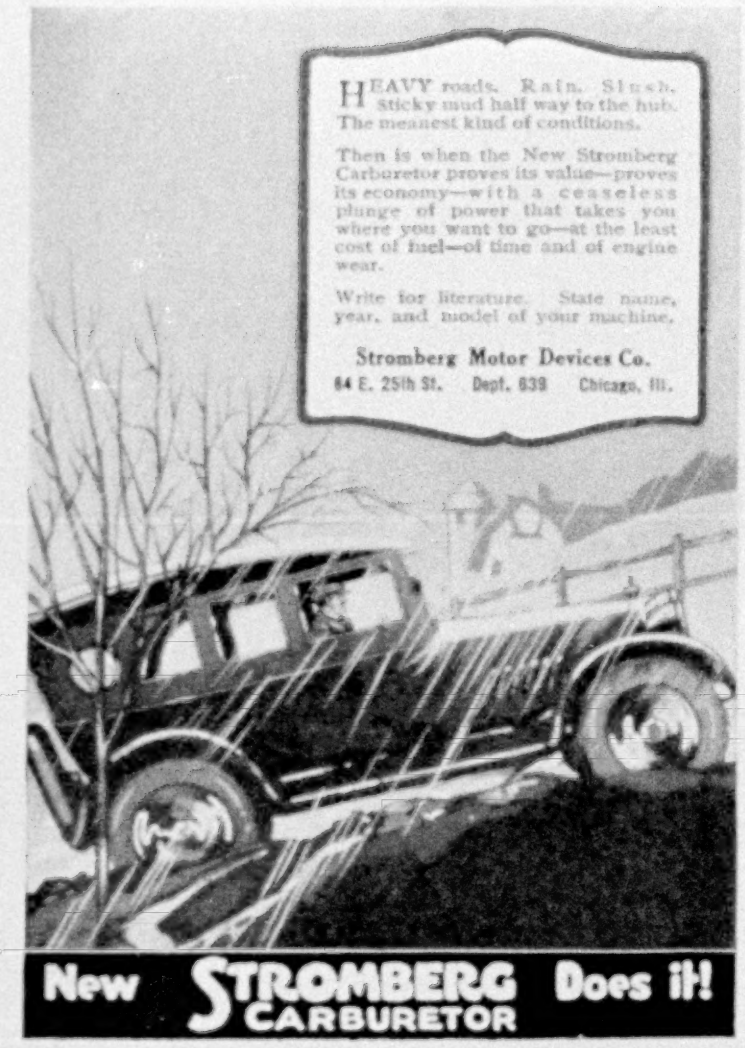
Cave-man's grass rope—Babylonian Sun-Dial—Grecian Hour-Glass—Egyptian Water Clock!

All down through the ages, in every clime, the world has gradually awakened to *the value of Time*—

—and to the necessity for accurate time-meters like those of the present day—

Elgin Watches

"Mention The Geographic—It identifies you"



HEAVY roads. Rain. Slush. sticky mud half way to the hubs. The meanest kind of conditions.

Then is when the New Stromberg Carburetor proves its value—proves its economy—with a ceaseless plunge of power that takes you where you want to go—at the least cost of fuel—of time and of engine wear.

Write for literature. State name, year, and model of your machine.

Stromberg Motor Devices Co.
64 E. 25th St. Dept. 639 Chicago, Ill.

New STROMBERG CARBURETOR Does it!

"The Vacation Land of Perfect Climate"

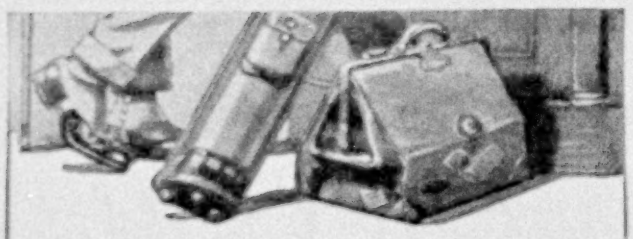
HIGHLANDS *of* ONTARIO

HAY FEVER unknown. One thousand to two thousand feet above the sea. Air scented with pine and balsam. Modern hotels in Algonquin Park, Muskoka Lakes, Georgian Bay, Lake of Bays, Kawartha Lakes and Timagami. A short pleasant ride from Toronto, and you are in the midst of a charming summer playground. Fishing, boating, bathing, golf, and the great out-of-doors. ***Write for free illustrated literature.***

GRAND TRUNK RAILWAY SYSTEM

C. G. ORTTENBURGER, Desk "C"
907 Merchants Loan & Trust Bldg.
Chicago, Ill.

A. B. CHOWN, Desk "C"
1270 Broadway, New York, N. Y.



When you travel

your baggage is exposed to innumerable hazards.

You insure these same effects while in your home where they are under your watchful care. Why not when you travel and they are subject to risks beyond your control?

Count up the value of your belongings. Figure it out. Can you afford not to

insure your baggage?

Think of the chances of loss from fire, theft, pilferage, etc., while it is in transit, in hotels, club-houses, and everywhere outside of your home! A NORTH AMERICA policy gives liberal protection and

costs but a few dollars a year

Write today for specimen policy or consult any North America agent.

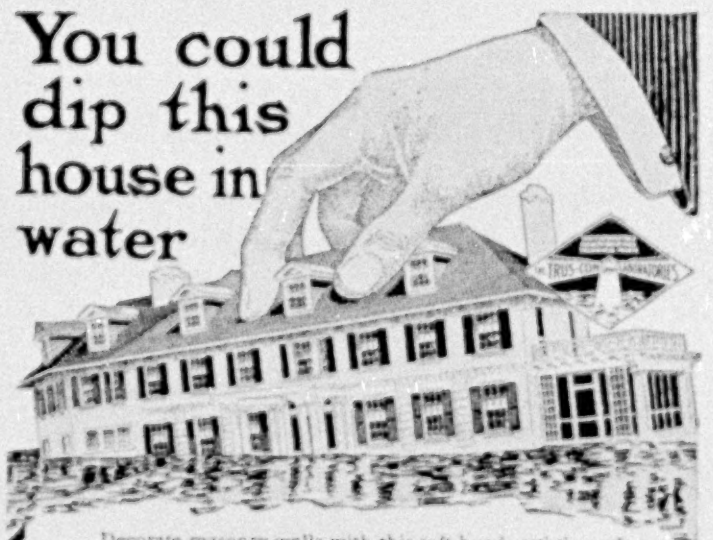
Special policy covering Salesmen's Samples.

Insurance Company of North America

Dept. B, Philadelphia

Any agent or broker can get you a North America policy

You could dip this house in water



Decorate masonry walls with this soft-hued, artistic surface just like the texture of stone from quarries, weatherproof, rainproof, and waterproof.

Stone Tex is a highly specialized, nationally known, liquid cement coating which is NOT a paint, though applied with a brush as easily as a paint. It remedies and prevents discoloration, cracking, and chipping.

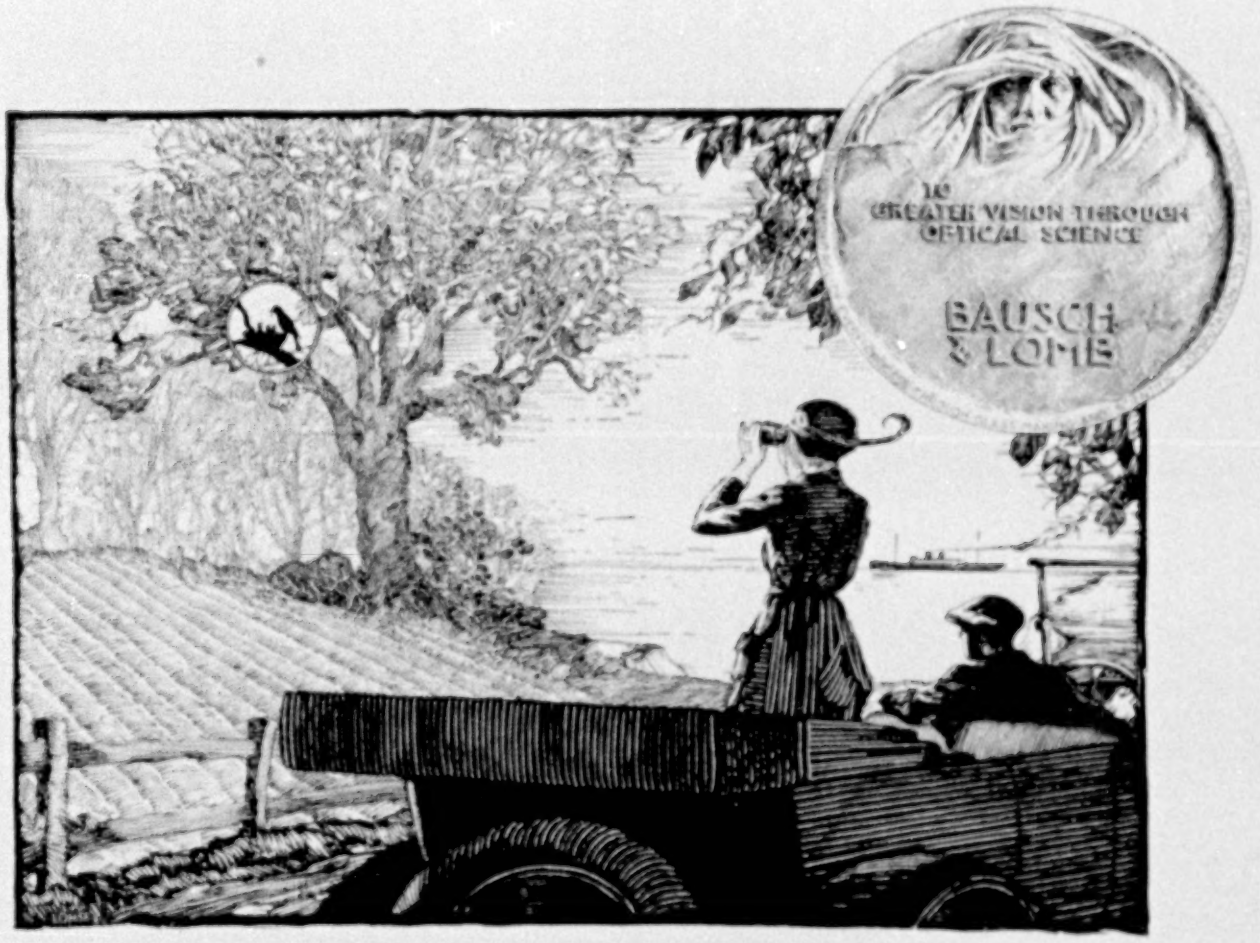
Stone Tex is prepared purposely to protect and beautify exterior walls of stucco, brick, concrete, or stone which have a peculiar porous texture and a chemical activity destructive to ordinary paints.

Write for free illustrated Stone Tex Book with attractive color samples.

The Truscon Laboratories
737 Caniff Avenue Detroit, Mich.

Renew Masonry Walls With

STONE TEX



To Help the Eyes See More and Farther —in the Woods, the Air, on Land or Sea

THE eyes of man function at comparatively close ranges. Unaided, they limit his enjoyment of outdoor life to his immediate surroundings and restrict his usefulness in many operations.

But through optics he has gained other and far-seeing eyes to help his own. Binoculars are made to lift his horizon and broaden his landscape, to unveil Nature's inaccessible reaches, to expose hidden dangers of the deep.

On every vessel of our Navy, large or small, with our forces on land and our heroes in the air, the binocular made an unparalleled war record. And we were its chief source of supply, meeting our government's crisis with more than twice as many binoculars in a week as we formerly produced in a year!

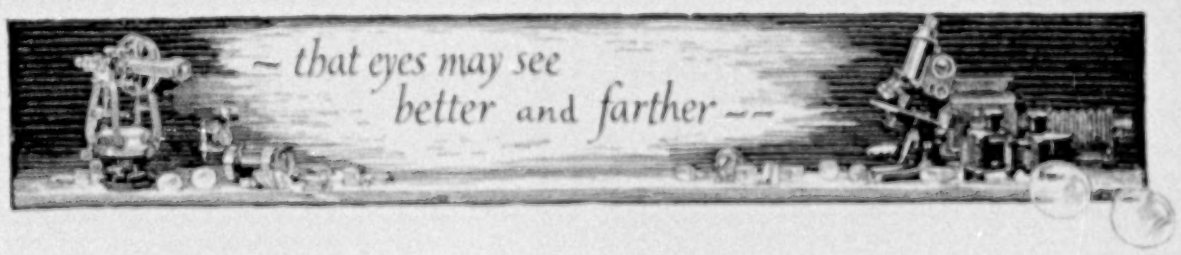
Now, in the ways of peace, the binocular is giving service no less varied and helpful. What autoist does not multiply by many times the interest of his tours, when accompanied by his binocular? Tourist, aeroplanist, sportsman, yachtsman, Nature student—all depend upon it to increase their vision and their pleasure.

Nor is this the only optical product which adds to the comfort, safety and efficiency of life. The microscope, ophthalmic and photographic lenses, projection apparatus, military instruments and others combine to give a service to the world, which we are proud to have been developing along lines of precision and quality since the middle of the last century.

Write for literature on any optical product in which you are interested.

BAUSCH & LOMB OPTICAL COMPANY, ROCHESTER, N. Y.

Makers of Eyeglasses and Spectacle Lenses, Photographic Lenses, Microscopes, Balopticons, Binoculars and Engineering and other Optical Instruments.



Dutch Bulbs
Order your Supply Now!

Advices from big growers in Holland indicate great scarcity of bulbs this coming season and enough cannot be grown to meet the demand. To insure getting your supply send us your order at once. **Until July 1st, not later**, our present low prices for the choicest varieties of bulbs grown by specialists in Holland will hold good.

By ordering from us now instead of waiting until fall, you make a large saving, *get a superior quality of bulbs not usually to be obtained at any price in this country*, and have a much larger list of varieties to select from.

Hyacinths, Tulips, Narcissi, Crocus, give, for a small outlay of time and money, an abundance of flowers in the house from December until Easter, and in the garden from earliest spring until the middle of May.

Our orders are selected and packed in Holland, and are shipped to our customers immediately upon their arrival in the best possible condition.

They need not be paid for until after delivery, nor taken if not satisfactory.

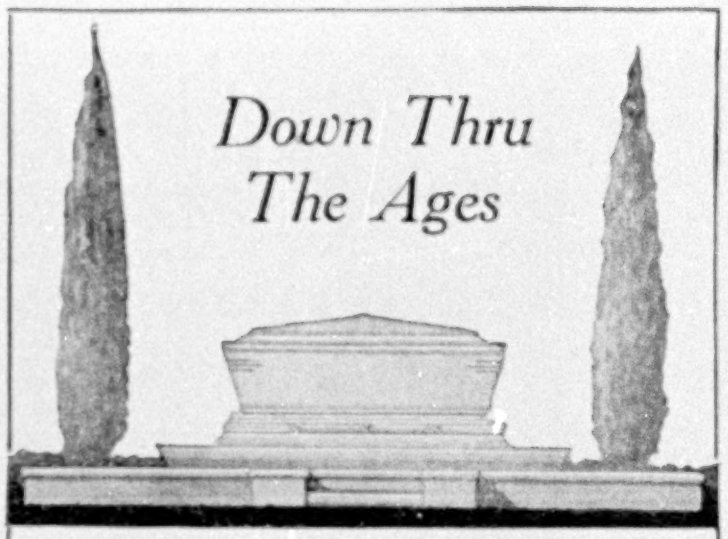
Write for
Free Booklet

Our booklet contains descriptions and prices of almost a thousand of the choicest imported Dutch Bulbs, suitable for growing in the house or garden and the directions given make failure practically impossible.

ELLIOTT NURSERY

355 Fourth Av. Pittsburgh, Pa.

Established 30 years. We have built up one of the largest bulb businesses in the world.



Down Thru The Ages

Monuments have kept alive the memory of ancient days.

A Harrison Memorial of enduring Barre Granite is a most fitting expression of reverential memory.

74 years of successful experience guarantee our ability to serve you intelligently.

Write for Booklet 3.

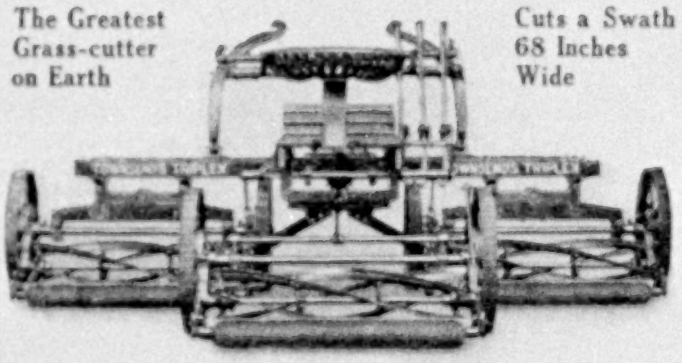
HARRISON GRANITE CO.
200 Fifth Ave., New York
Offices in principal cities Works: Barre, Vt.
Member of Memorial Crafts Institute

HARRISON MEMORIALS

TOWNSEND'S TRIPLEX

The Greatest Grass-cutter on Earth

Cuts a Swath 68 Inches Wide



Floats Over the Uneven Ground as a Ship Rides the Waves

One mower may be climbing a knoll, the second skimming a level, while the third pares a hollow. Drawn by one horse and operated by one man, the TRIPLEX will mow more lawn in a day than the best motor mower ever made; cut it better and at a fraction of the cost.

Drawn by one horse and operated by one man, it will mow more lawn in a day than any three ordinary horse-drawn mowers with three horses and three men.

Does not smash the grass to earth and plaster it in the mud in springtime, neither does it crush the life out of the grass between hot rollers and hard, hot ground in summer, as does the motor mower.

The public is warned not to purchase mowers infringing the Townsend Patent, No. 1,209,519, December 19th, 1916.

Write for catalog illustrating all types of Lawn Mowers.

S. P. TOWNSEND & CO.
27 Central Avenue Orange, New Jersey

Dodson Wren House
4 compartments, 28 inches high, 18 inches in diameter.

Solve the Housing Problem
for the Birds

by erecting Dodson Bird Houses. Their attractiveness wins the birds, and they are scientifically built by Mr. Dodson, who has spent a lifetime in studying the birds, their habits, and in attracting them to Beautiful "Bird Lodge," his home and bird sanctuary on the Kankakee River.

The Dodson Bird House

will add to the beauty of your grounds and the birds will protect your flowers and shrubbery.

Price **$6**

Order Now — the birds are seeking homes.

Free Bird Book — Sent on Request — illustrating Dodson Line, giving prices; also beautiful colored bird picture free.

Joseph H. Dodson
President American Audubon Association
702 Harrison Avenue, Kankakee, Illinois

Dodson Sparrow Trap guaranteed to rid your community of these quarrelsome pests. Price $8.00

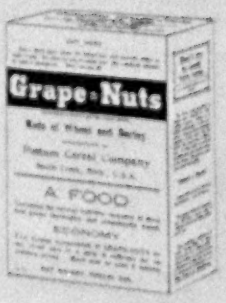
Getting Husky, Son—
Grape-Nuts Agrees!

This delicious wheat and malted barley food provides, in easily digestible form, essential elements Nature requires for growth, health and strength.

"There's a Reason" for

Grape-Nuts

At Grocers Everywhere



Ideal for School Prize or Summer Gift

The Book of Birds

200 pages, 250 portraits in full colors, 54 half-tones, 13 charts and maps :: ::

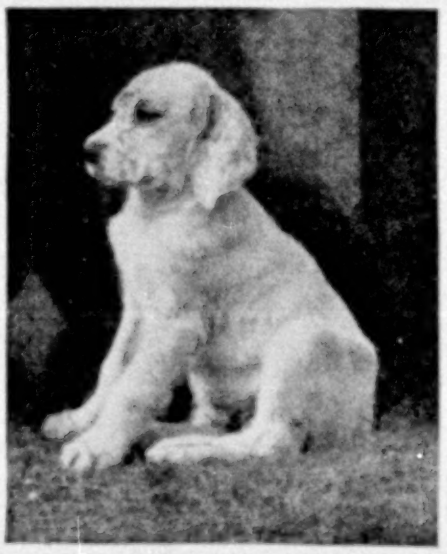
How many different birds sing and nest in your trees?

The wonderful color pictures of Louis Agassiz Fuertes will enable you to know and name them. The fascinating descriptions of Henry W. Henshaw will let you share their intimate nesting secrets. This book makes children loving guardians of the birds.

Buckram or flexible khaki, postpaid in U.S.A., $3.00

The Book of Dogs

128 portraits in natural colors, 26 half-tones, and guide chart



What dogs make the best playmates and home guardians?

Leading authorities help you to understand breed, points, and dog character. The color portraits of Louis Agassiz Fuertes, master painter of animals, enable you to identify the dogs you see on the street. Rich in stories of dog devotion, sagacity, and heroism.

Buckram or flexible khaki, postpaid in U.S.A., $2.00

Wild Animals of North America

127 full-color portraits

33 half-tones, 50 track sketches

Is the little creature in your yard a friend or enemy?

The familiar animals of park, suburb, and countryside, as well as the denizens, large and small, of forest and ocean, are described by Edward W. Nelson, learned but very human friend of the four-legged world.

Roosevelt said of this book: "It is of interest to every intelligent out-of-doors man or woman. It is a delight to the lover of life in the open."

What is the largest flesh-eating animal in America?

Color portraits by Fuertes, master painter of animals, have preserved not merely the form and color, but the very character of America's furry citizens.

Like the Bird and Dog Books, it is treasured alike by adult or child and is an essential tool to every teacher of natural science. These books should be in every school, camp, Sunday school, or other library for young folks.

Buckram or flexible khaki, postpaid in U. S. A., $3.00

CUT ON THIS LINE

Dept. H, National Geographic Society, Washington, D. C.:

.....1920

Please send.....copies THE BOOK OF DOGS; .....copies THE BOOK OF BIRDS; .....copies WILD ANIMALS OF NORTH AMERICA.

Enclosed.....Dollars

NAME..... ADDRESS.....

(6-20)

Obtainable only from the Society's Headquarters

GRAFLEX

There is certainty in picture-making with a Graflex. The user of the Graflex brushes aside the usual handicaps—he almost disregards subject, time, place or light.

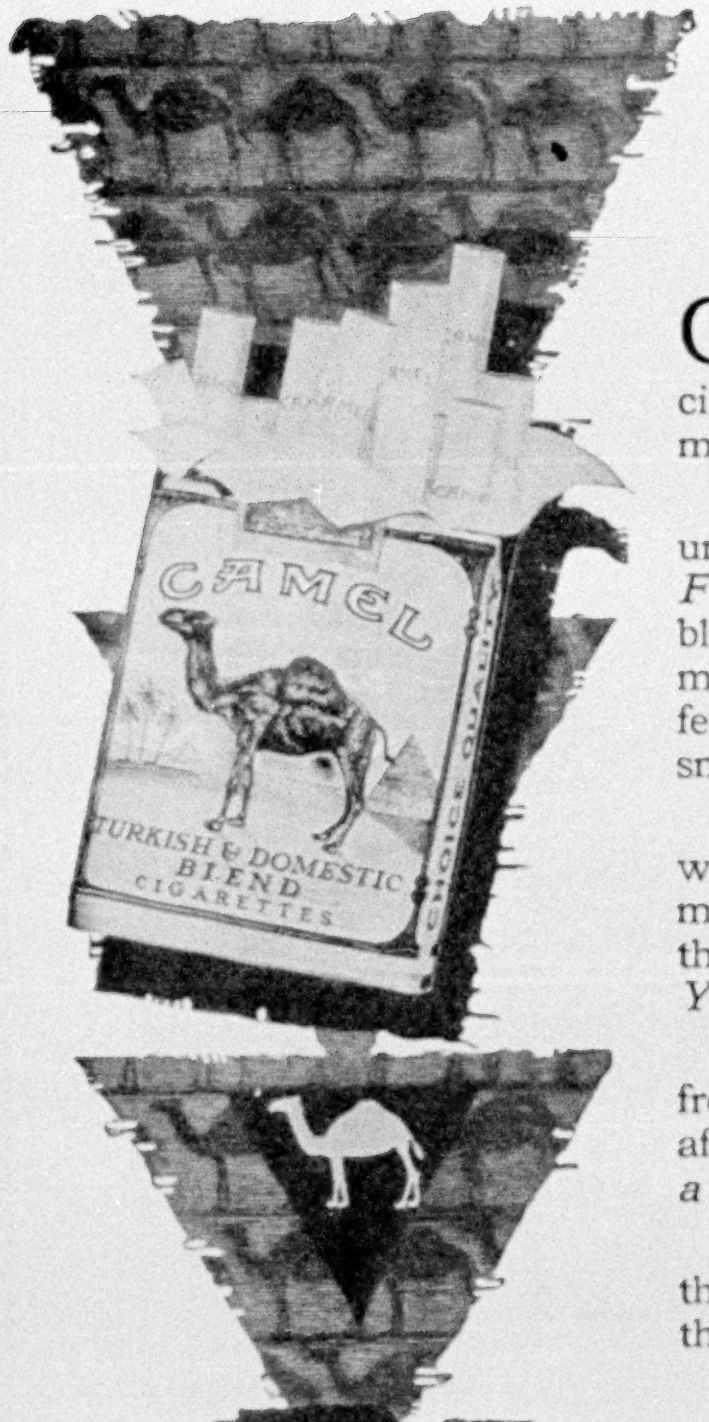
The 1-1000 of a second snap that stops the bird on the wing, the slow snap for an indoor portrait, the prolonged time exposure—all are easily within its scope.

Graflex widens the possibilities of pictorial achievement.

Eastman Kodak Company

Folmer & Schwing Department Rochester, N. Y.

Catalogue free at your Dealer's or by mail.



There's no two ways about it!

No better cigarette can be made than Camels!

GET the idea at once that Camels and their refreshing flavor are unlike any cigarette you ever smoked—that's why men call Camels a cigarette revelation!

You should know why Camels are so unusual, so delightful, so satisfying. *First,* quality—*second,* Camels expert blend of choice Turkish and choice Domestic tobaccos, and you'll certainly prefer Camels blend to either kind of tobacco smoked straight!

Camels blend makes possible that wonderful mellow mildness you hear so much about—yet the desirable body is there to any smoker's absolute satisfaction! *Yet, Camels never tire your taste!*

How you'll appreciate, too, Camels freedom from any unpleasant cigaretty aftertaste or unpleasant cigaretty odor—*a cigarette revelation all by itself.*

Pick Camels for trial and compare them puff-by-puff with any cigarette in the world at any price!

Camel CIGARETTES

R. J. Reynolds Tobacco Co.
Winston-Salem, N. C.

Camels are sold everywhere in scientifically sealed packages of 20 cigarettes for 20 cents; or ten packages (200 cigarettes) in a glassine-paper-covered carton. We strongly recommend this carton for the home or office supply or when you travel.

"Mention The Geographic—It identifies you"

How to Soften Your Beard

Yet Avoid Slow, Harsh Ways

How Shavaid Makes Lather Doubly Effective

To men who find shaving exasperating, we offer here a new freedom. A better, quicker, simpler way which, once tried, you will never abandon. And we back our statements with a Free Trial Tube, so that you may be completely convinced. The coupon brings it.

THIS is to urge you to try—for your own sake—a new shaving method. A way which has already won the friendship of thousands of men the country over.

Your trial of Shavaid, we promise, will be a revelation. For most men have come to the conclusion that shaving would always be a task.

Read here what Shavaid does; then—if these things appeal to you—let actual proof decide whether you can be content with the old tedious way.

Saves Time and Trouble

Merely apply a thin coat of cooling Shavaid to the dry face. Then your favorite lather, which needs no rubbing in. Then shave with real comfort.

No need to copy the barber's preparations. He uses hot water, hot towels. He rubs the lather in. Yet, when he is through, there is irritation. So he applies lotions.

Harsh, harmful ways of treating the face should be avoided. They age the skin. Wrinkles come too early. The skin becomes leathery.

The Shavaid way is the comfort way. It is scientific, the result of countless experiments and tests.

Shavaid

Softens the beard instantly
—apply to dry face before the lather.

Saves time and trouble
—no hot water, no "rubbing in" of the lather.

Protects the face
—skin remains firm and smooth.

Removes the razor "pull"
—harsh ways age the skin prematurely.

Replaces after-lotions
—Shavaid is a cooling, soothing balm.

More Than a Time Saver

Shavaid, of course, appeals chiefly because it saves time. But it does more than that—it saves the skin. While softening the beard instantly, it also forms a protecting layer over the cuticle. The skin remains firm and smooth.

The razor glides over without pulling, without scraping the skin. Abrasions are not so frequent.

The closest shave causes no discomfort.

When you use Shavaid, you can discard the after-lotions, for the sources of mistreatment are gone.

Try This Luxury Shaving Method

The coupon below brings you a Free Trial Tube. Send for it now. Then see if you want to adopt Shavaid.

We are sure it will delight you, amaze you, and that you will never shave again without it.

And you will tell your friends of this better way.

Shavaid, only recently introduced nationally, brought orders from dealers everywhere. Get it at your nearest druggist for 50c a tube.

If your dealer cannot supply Shavaid we will be pleased to fill your order direct.

B&B

Shavaid

At Druggists—50c a Tube

BAUER & BLACK Chicago New York Toronto

Makers of Sterile Surgical Dressings and Allied Products

93

Free Trial Tube

BAUER & BLACK, Chicago, Ill.

Mail free trial tube of Shavaid to

Name .....

Street Address .....

City..... *State* .....

Delightful Vacation Trips of Over 2000 Miles of Beautiful Scenery, Shore Line, Islands, Rivers, and Bays on the Big, New Cruising Ships

"North American" and "South American"

Cruises Weekly from Chicago, Duluth, Buffalo (Niagara Falls), Detroit, and Cleveland via Mackinac Island, Georgian Bay (30,000 Islands) and Return

Stops of several hours made at all principal points of interest—ample time to see the sights. The **New Ships "North American" and "South American"—Passenger Service Exclusively**—are equipped to give a service equal to the best Atlantic Liners. These magnificent steamships have many innovations for travel, comfort, and amusement—a ball-room, an orchestra, children's open-air playgrounds, and deck games. All these are free. Steamer chairs and steamer rugs available. **Dining Service and Food Equal to that of the Best Hotels.**

12 DAYS' CRUISE, $125—3,600 MILE TRIP

Call or write for pamphlet and full information about

THE LAKE TRIPS THAT HAVE NO EQUAL

Chicago, Duluth & Georgian Bay Transit Co.

W. H. BLACK, General Passenger Agent
314 S. Clark St., Chicago, Ill.

WILLARD E. BROWN, General Agent
16 East Eagle St., Buffalo, N. Y.

Patented Jan. 23, 1917.

The SAVo Steel ALL-YEAR-ROUND FLOWER BOX

Self-Watering and Sub-Irrigating

For Windows, Porches, Ledges, Sun Parlors, etc. Leak Proof and Rust Proof. No surface watering. Move Savo Boxes indoors or outdoors and have beautiful Flowers and Plants the year round.

Write for FREE Catalog

Savo Manufacturing Co., Dept. D, 39 S. La Salle St., Chicago

"Mention The Geographic—It identifies you"

AT THE START, W. L. DOUGLAS WAS BUYER, CUTTER, SALESMAN AND FREQUENTLY HIS OWN EXPRESSMAN AS WELL. OLD BROCKTON RESIDENTS TELL OF OFTEN SEEING HIM COMING FROM BOSTON CARRYING A ROLL OF LEATHER UNDER HIS ARM

W.L.DOUGLAS FREQUENTLY WORKED EIGHTEEN TO TWENTY HOURS A DAY—RETURNING TO HIS FACTORY MANY A NIGHT TO LAY OUT THE NEXT DAY'S WORK, AFTER SPENDING THE DAY IN BOSTON BUYING LEATHER AND SELLING SHOES

BEGAN MANUFACTURING JULY 6 1876

W. L. DOUGLAS

"THE SHOE THAT HOLDS ITS SHAPE"

FOR MEN AND WOMEN

$7.00 $8.00 $9.00 & $10.00 SHOES

BOYS' SHOES
$4.50
$5.00
$5.50

W.L.Douglas shoes are sold in 107 of our own stores direct from factory to the wearer. All middlemen's profits are eliminated. W.L.Douglas $9.00 and $10.00 shoes are absolutely the best shoe values for the money in this country. W. L. Douglas name and the retail price stamped on the bottom guarantees the best shoes in style, comfort and service that can be produced for the price.

Stamping the price on every pair of shoes as a protection against high prices and unreasonable profits is only one example of the constant endeavor of W. L. Douglas to protect his customers. W. L. Douglas name on shoes is his pledge that they are the best in materials, workmanship and style possible to produce at the price. Into every pair go the results of sixty-seven years experience in making shoes, dating back to the time when W. L. Douglas was a lad of seven, pegging shoes.

The quality of W.L. Douglas product is guaranteed by more than 40 years experience in making fine shoes. The smart styles are the leaders in the fashion centers of America. They are made in a well-equipped factory at Brockton, Mass., by the highest paid, skilled shoemakers, under the direction and supervision of experienced men, all working with an honest determination to make the best shoes for the price that money can buy. The retail prices are the same everywhere. They cost no more in San Francisco than they do in New York.

W. L. Douglas shoes are for sale by over 9000 shoe dealers besides our own stores. If your local dealer cannot supply you, take no other make. Order direct from the factory. Send for booklet telling how to order shoes by mail, postage free.

CAUTION.—Insist upon having W. L. Douglas shoes. The name and price is plainly stamped on the sole. If it has been changed or mutilated, BEWARE OF FRAUD.

W.L.Douglas

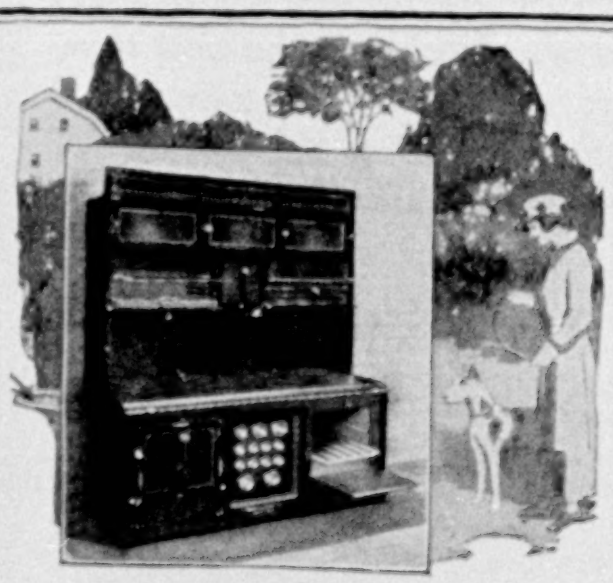
President
W.L.Douglas Shoe Co.,
130 Spark Street,
Brockton, Mass.

WHITE HOUSE COFFEE

None better at any price

The up-to-date coffee package keeps all goodness in, all badness out, and delivers to you the same splendid quality that has made White House Coffee famous. 1-, 3- and 5-lb. packages only. *Never in bulk.*

DWINELL-WRIGHT CO., *Principal Coffee Roasters,* BOSTON—CHICAGO



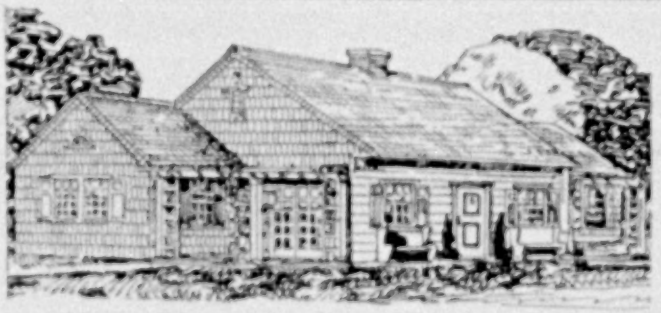
Electric Range designed and built for Harding Allen, Barre, Mass. L. W. Briggs Co., Architects.

Deane's French Range

The best cook is handicapped with a poor range. *Deane Ranges* are designed to give the highest type of service to meet your needs and to burn any kind or combination of fuels.

Ask your architect to specify *Deane's French Range* and write us for "The Heart of the Home," a portfolio of built-to-order ranges.

BRAMHALL, DEANE CO.
261-263 West 36th St., New York, N.Y.



Save Money on Your New Home

With building materials and labor costs 300% higher now than ever before, it is impossible to build a house in the old hand-labor way at anything approaching a reasonable figure. And, because of constantly increasing prices, you cannot know until the work is completed what the total cost will be.

If you want a home you will be proud to own and one you can afford—"Get a Bossert House." Bossert houses are built at the plant and erected on your property. They are not to be confused with portable houses or temporary makeshift buildings, and are stronger and better built than the average house erected on the site in the old hand-labor way. The many beautiful types of Bossert houses offer you a wide range of choice, and minimize the chance of architectural duplication.

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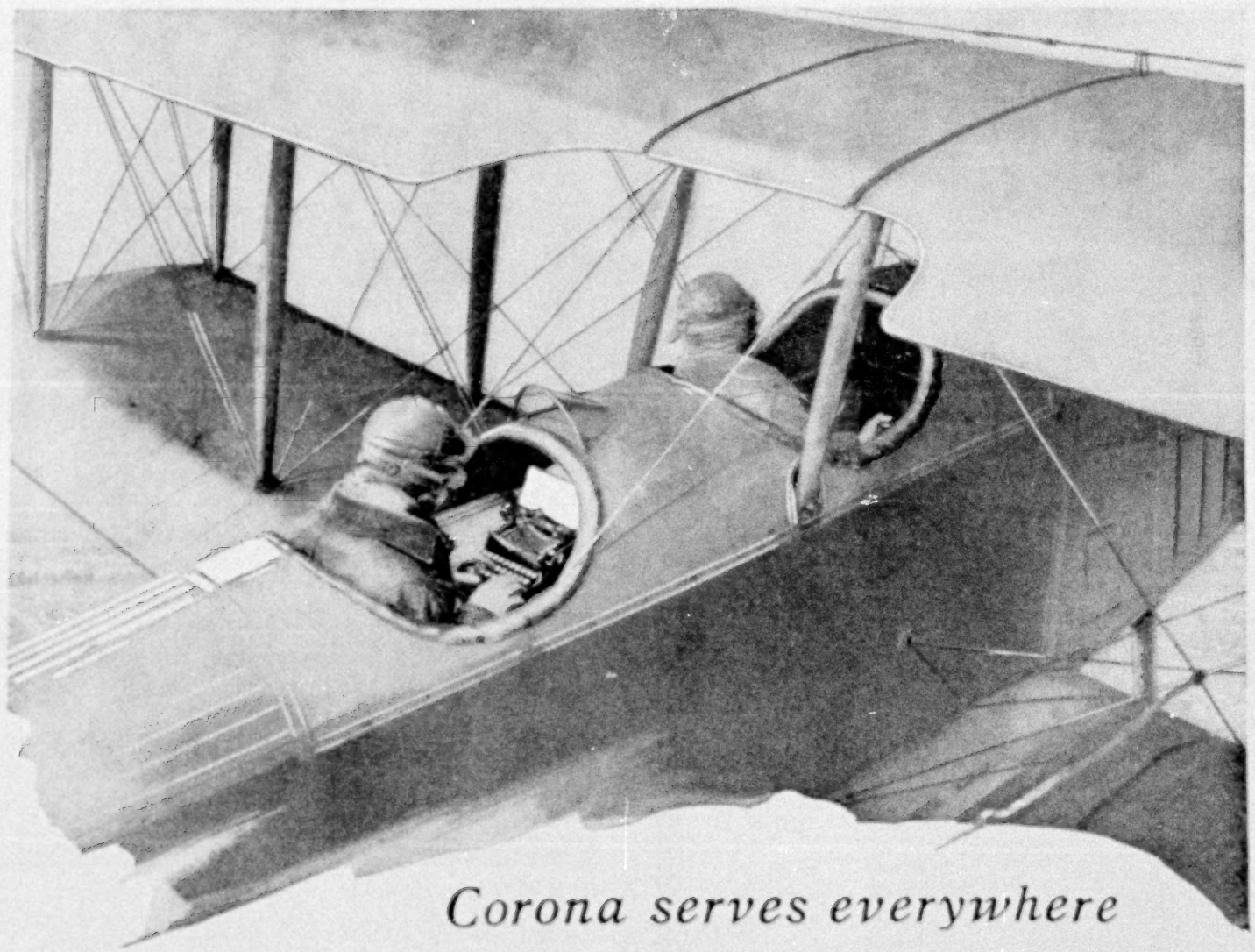

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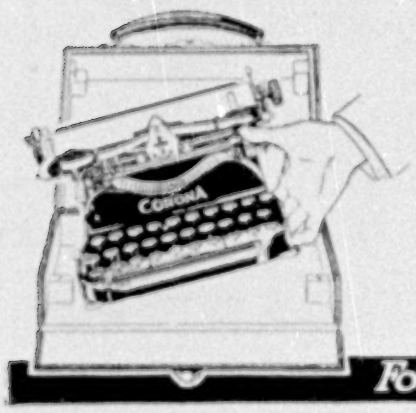

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Under the gums is where pyorrhea starts. Pyorrhea destroys the tooth foundation—the bony sockets which hold the teeth in place.

The teeth may be white and free from decay. But if the germs of pyorrhea have infected the gums and root sockets, your teeth may loosen and fall out or have to be extracted — because their supporting foundation is gone.

So it is vital to keep your gums healthy — and to restore them to health if they bleed easily, are soft or tender, have begun to recede.

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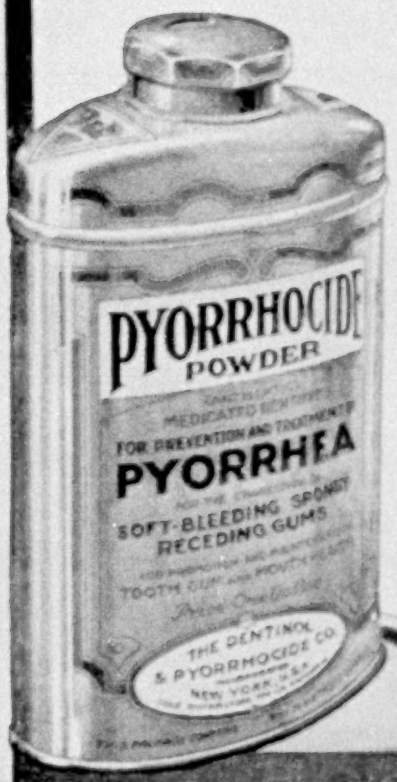
Pyorrhocide Powder tones up the gums, stimulates their blood circulation, helps to make them hard and firm. Its effectiveness has been *proved* by thorough tests in clinics devoted to pyorrhea research. Dentists everywhere recommend it.



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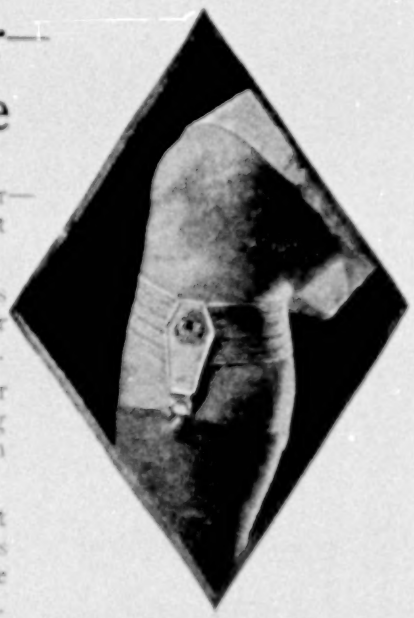

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The wide webbing holds firmly, but you are never *aware* of its presence.

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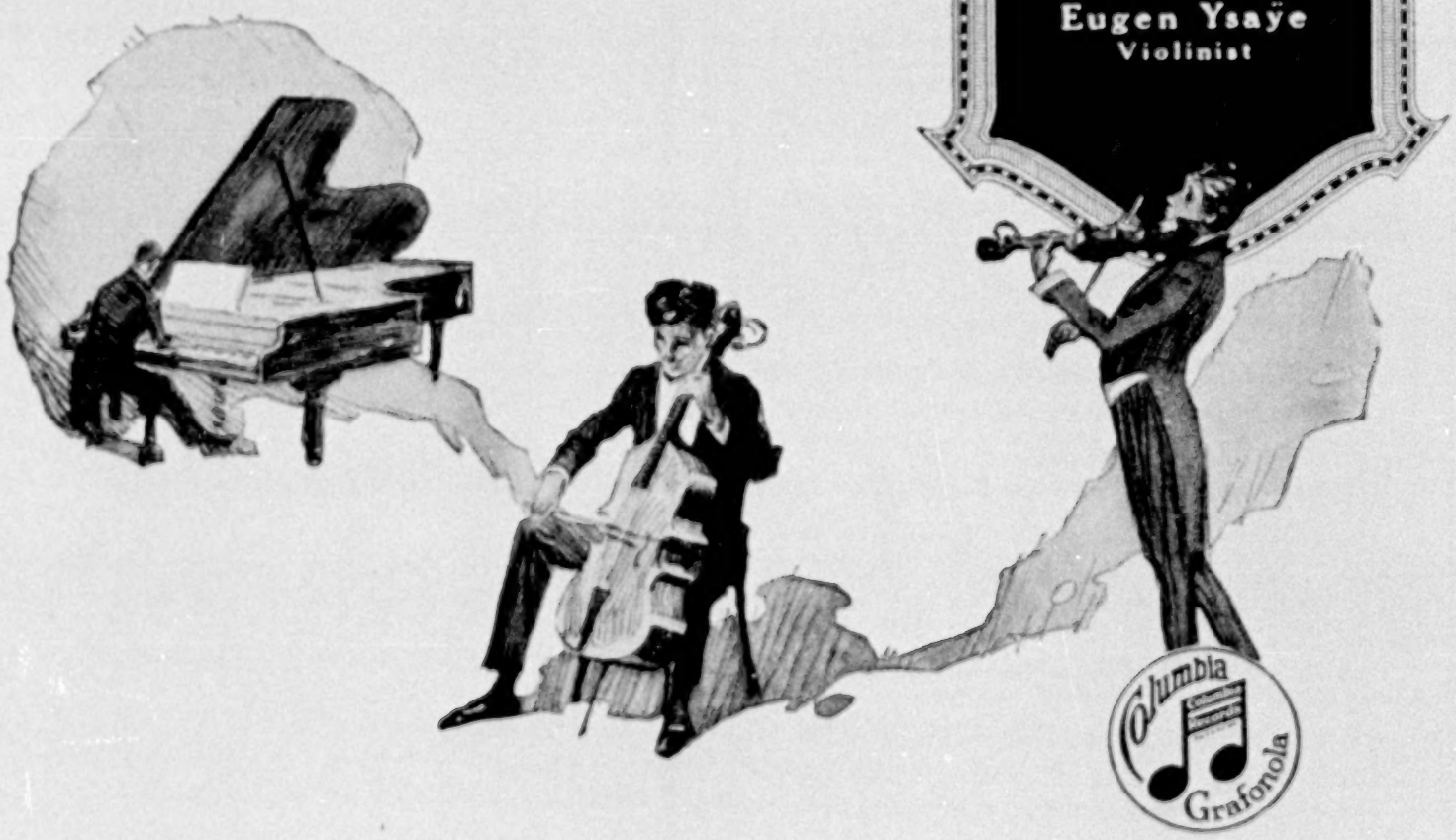

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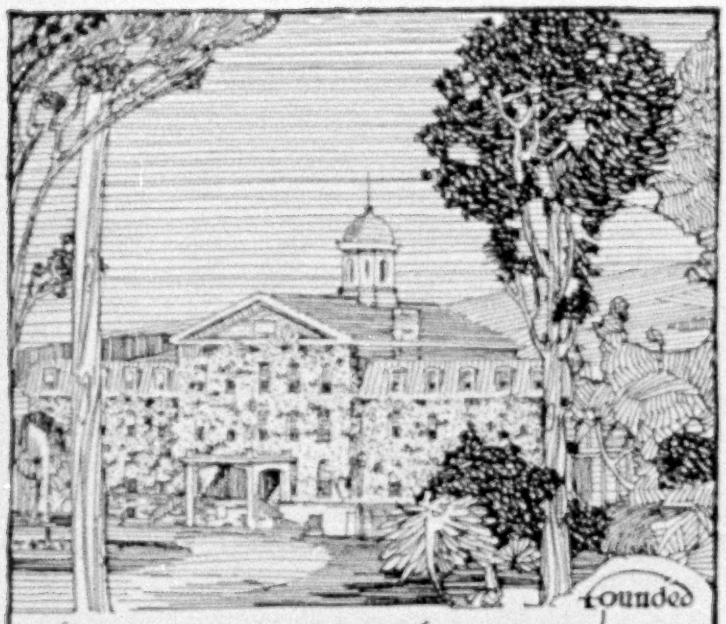

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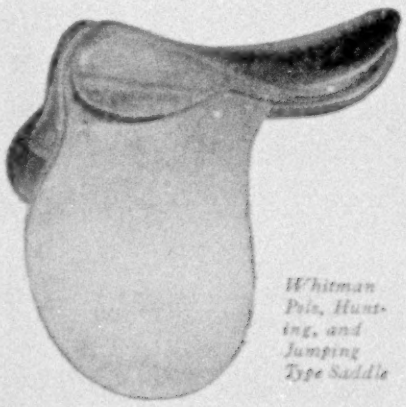

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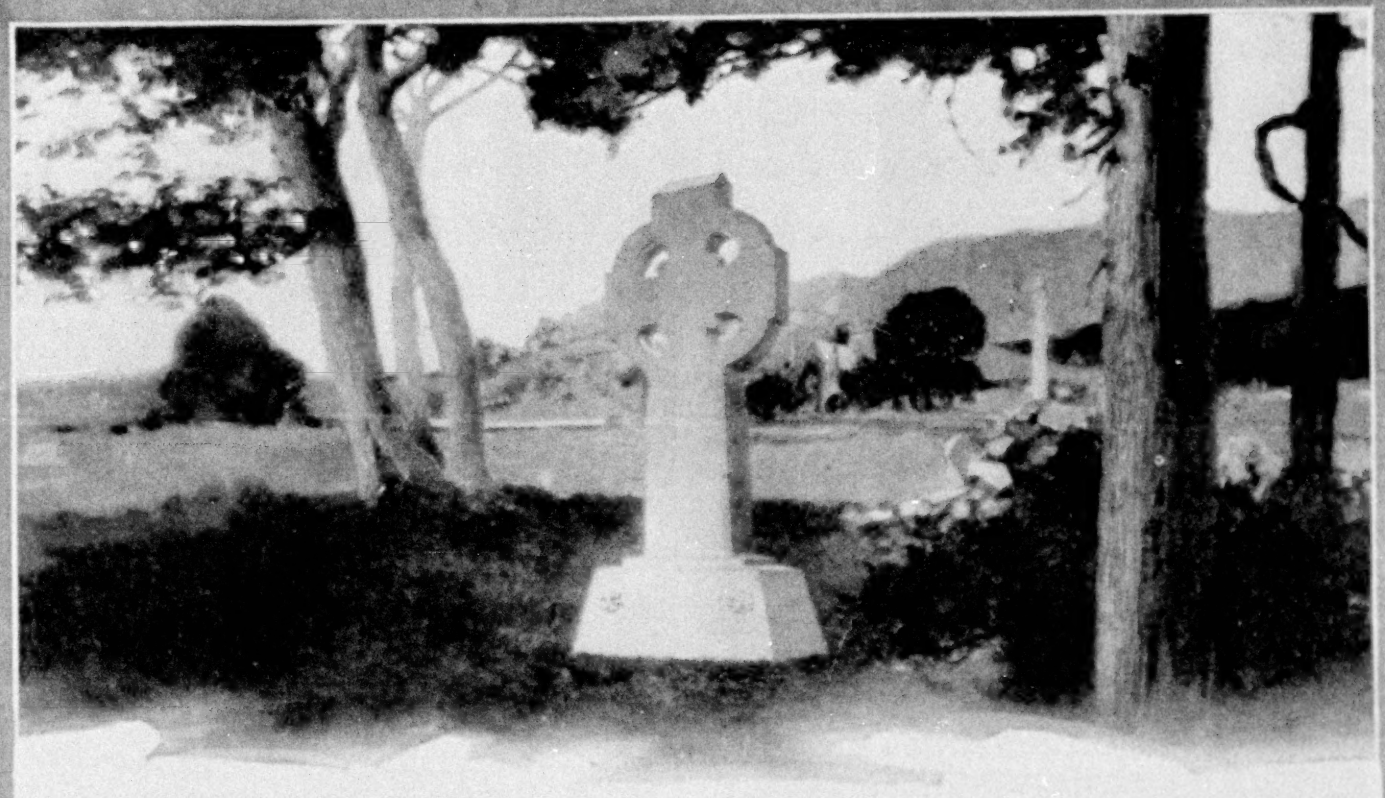

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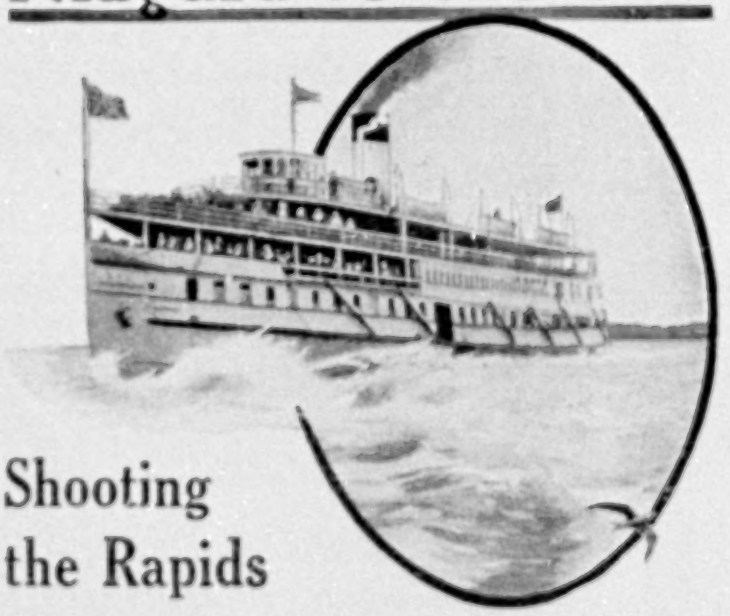

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It is really a mirroring of the confidence placed in Goodrich products by their users.

In five words it crystallizes the ideals, the policies, the principles of Goodrich.

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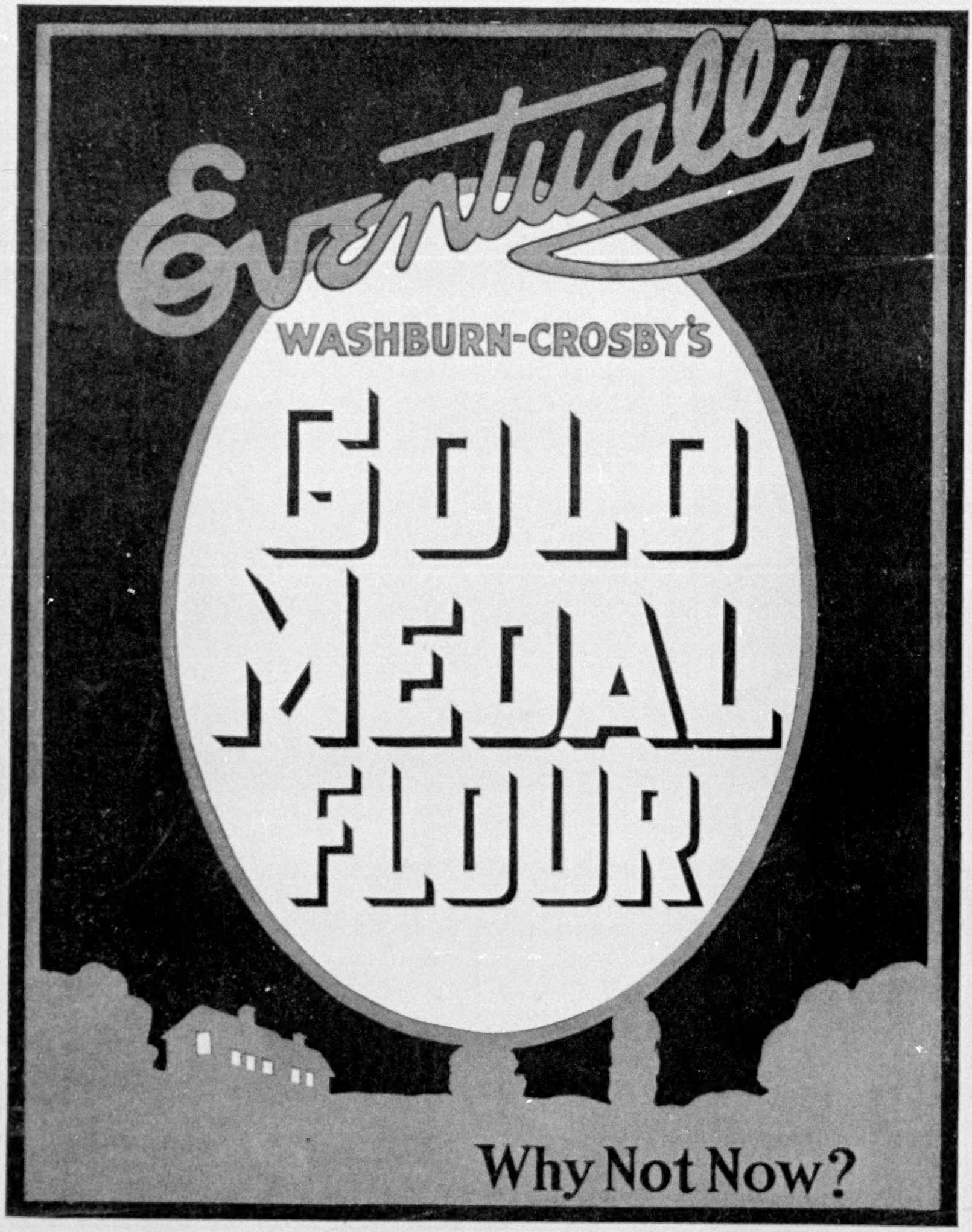
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